बी एआरसी न्यूज़लैटर
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IN THIS ISSUE

In the Next Issue

Development of α-Al_2O_3:C phosphor for personnel dosimetry using optically stimulated luminescence technique

Presently, two techniques are used for dosimetry, for measuring doses received by individuals, working in radiation environment. One is the Thermally Stimulated Luminescence (TSL) techniques and the other is Optical Stimulated Luminescence (OSL) technique. The OSL mode of luminescence has added advantages of a) operation at room temperature b) avoidance of thermal quenching c) multiple and faster readouts of doses and d) can be used for remote measurements. For this purpose, a highly sensitive, transparent and chemically robust OSL phosphor is required.

The present article describes two methods of developing such a phosphor for personnel dosimetry. The TPPED in collaboration with RSSD, has developed a phosphor of α-Al_2O_3:C, using two new techniques of preparation. In the first method, α-Al_2O_3 single crystals are heated in reducing environment, in the presence of graphite and in the second method, a simple and inexpensive technique of melt processing alumina powder in reducing environment has been demonstrated.

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A REVIEW ON THE DEVELOPMENT OF ENRICHMENT SCANNERS FOR PLUTONIUM AND EXPERIMENTAL URANIUM NUCLEAR FUELS

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ABSTRACT

Gamma scanning is a nondestructive assay technique, which can be effectively used for inspection of nuclear fuel pins. The fuel pin is scanned along its length, to ensure that the fuel conforms to specifications, meeting the stringent requirements of uniformity, enrichment and active stack length, required for optimum performance. Methodologies for scanning of nuclear fuel pins were developed at BARC during the last three decades and a few gamma scanners were fabricated. These gamma scanners are based on using either Passive Gamma Scanning (PGS) or Active Gamma Scanning (AGS) techniques. The fabricated scanners were tested, calibrated, validated and are currently in use. In the present article, three gamma scanners that were fabricated for FBTR fuel pins, MOX fuel pins and for gamma absorption fuel densitometry are described. Spatial differential plutonium gamma activity (80-500 keV) using a NaI(Tl) detector was measured in both the FBTR and MOX fuel pin scanners, based on PGS. Provision to carry out active gamma scanning by active interrogation, which is helpful in revealing the internal details of the fuel elements, was also made. A modified FBTR fuel pin scanner bench mechanism has been used as a gamma absorption fuel densitometer, with ^{57}Co gamma source, in which transmitted gamma intensity was measured. Transmitted intensity profile was utilized, to calculate the active stack length of the fuel pin, fissile material density and its uniformity in the fuel pin. The precisions for stack length and fuel density were better than 0.5% and 5% respectively.

Introduction

Plutonium-based fuels for both fast and thermal reactors are being fabricated by BARC. Plutonium-uranium mixed carbide fuel pins for Fast Breeder Test Reactor (FBTR) at Kalpakkam, are being fabricated in the Radiometallurgy Division. Uranium-plutonium Mixed Oxide (MOX) fuel of various types, for thermal and fast reactors are being fabricated in the Advanced Fuel Fabrication Facility(AFFF), BARC, Tarapur.

The performance of the nuclear reactor depends on the specifications of the nuclear fuel and other components that make the reactor. The shape and size

of fuels is decided upon, by the nature and type of nuclear reactor e.g. for the FBTR, the fuel is in the form of small ceramic pellets stacked together with other hardware and encapsulated in SS clad tubes, for the BWR, the fuel is uranium and plutonium mixed-oxide ceramic pellets stacked and encapsulated in zircaloy tubes, for the PFBR, the fuel is ceramic pellets, slightly bigger than the FBTR pellets, stacked and encapsulated in SS clad tubes. The fabrication of these fuels, therefore, includes many nondestructive inspection techniques, to ensure their conformance to specifications, so that they perform optimally in a nuclear reactor. One of the characteristics that the nuclear fuel material (shaped and encapsulated) that needs to be evaluated for, is their fissile enrichment and uniformity of spatial distribution. Non-destructive assay based techniques use the emitted gamma or neutron radiations from the nuclear fuel, to assay or characterize the content of the nuclear fuel, in a fabricated fuel element. These techniques which are very essential in the area of safeguards and security for nuclear fuels, can be adapted to serve as tools for inspection in the quality control of fuel elements during fabrication. There has been extensive collaborative work carried out in Radiometallurgy, Advanced Fuel Fabrication Facility, Radiochemistry and Reactor Control Divisions towards development of the enrichment scanners, for the quality control of fabricated nuclear fuels.

A nuclear fuel element consists of appropriate hardware placed on either side of the active nuclear fuel pellet stack, to hold it in place, encapsulated in a clad–tube by welding end-plugs to both ends of the tube. After encapsulation, it is important to confirm the enrichment of the fuel pellets, the uniformity of enrichment along the length of the fuel stack and length of the active fuel stack, nondestructively. The order of all the internal components, from the bottom plug-end to the top-plug end, inside the fuel tube also requires to be confirmed. Nondestructive inspection of these characteristics of the nuclear fuel element, is carried out using Gamma Scanning. The term scanning implies the uniform motion of a fuel pin in front of a collimated and shielded detector, so that, the spatial distribution of gamma activity along the length of the fuel pin can be evaluated, based on the recorded activity profile.

Gamma scanning is carried out in two modes i.e. Passive and Active. In Passive Gamma Scanning (PGS), the signature gamma rays emitted by various isotopes in the fuel are measured. In Active Gamma Scanning (AGS), measurement of the absorbed / transmitted gamma radiation from an external gamma source, which is made to pass through the fuel or fission gammas from fissile material in the fuel pins, irradiated with neutrons, is carried out.

Description of a gamma scanning system

A typical gamma scanning system will have a bench mechanism which is designed and developed for the purpose. Fig. 1 is a schematic of a typical scanner system. It has a provision to place the shielded

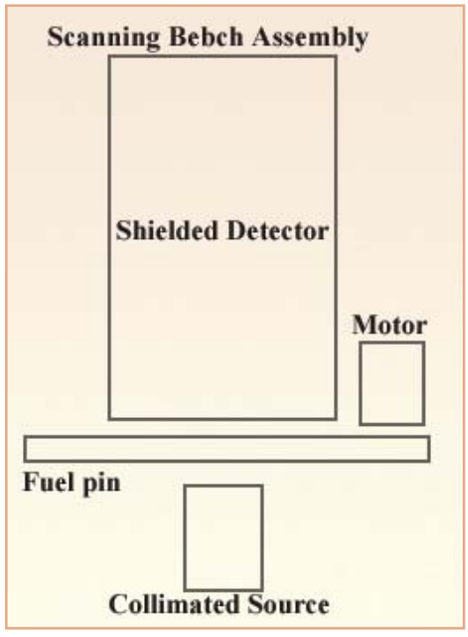

Fig. 1. : Schematic of a gamma scanning system

radioactive source with the collimator and the fuel pin. The collimator of the source was chosen such that, its diameter and height are less than the diameter of the pin, which is the maximum path length. A well shielded detector is placed across the source, immediately after the pin. The collimator of the detector is arranged to receive the transmitted beam of the gamma rays. A provision is made for the uniform motion of the pin, to enable the density measurements as a function of length. The vibration free uniform movement is achieved by a stepper motor controlled bench mechanism.

Data Acquisition system

The system includes a PC with PC compatible card, and a gamma ray counting system with a Single Channel Analyzer (SCA). The output from the SCA is fed to the PC. The counts from the SCA are recorded in the Multi Channel Scaling (MCS) mode with a selectable dwell time. The data, which represents the emitted intensity or transmission intensity as a function of the length of the pin, is stored in an array. A running twenty point average method can be used, to reduce the local fluctuations.

Gamma scanning of FBTR fuel elements

The FBTR fuel pin is a stainless steel tube, sealed at both ends by welded stainless-steel (SS) end-plugs [1]. Inside the tube, from the bottom end-plug, are the SS plenum tube and plenum tube support disc, a uranium carbide insulation pellet, the plutonium-uranium carbide fuel stack, another insulation pellet and finally an SS

spring support disc and a spring to hold all the components in place and the top plug. Fig. 2 shows a schematic of the FBTR fuel pin.

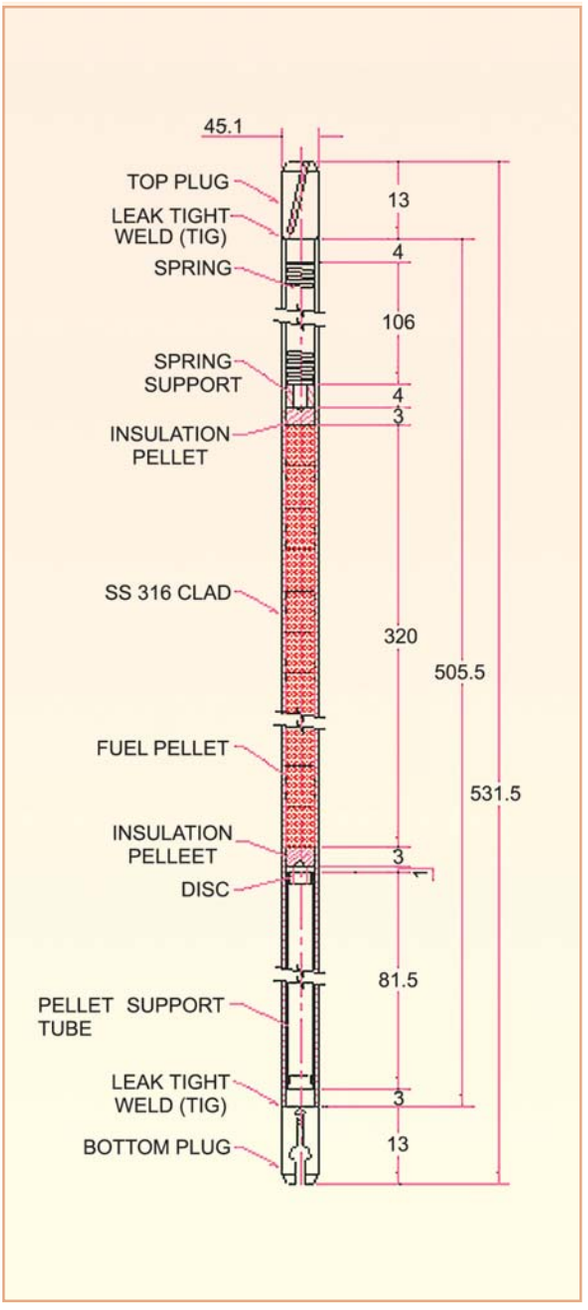

Fig. 2 : Schematic view of an FBTR fuel pin

A combination of PGS and AGS is required to monitor the active fuel stack and the internal arrangement of the SS components. The passive gamma scanner developed for the monitoring of the active fuel stack,

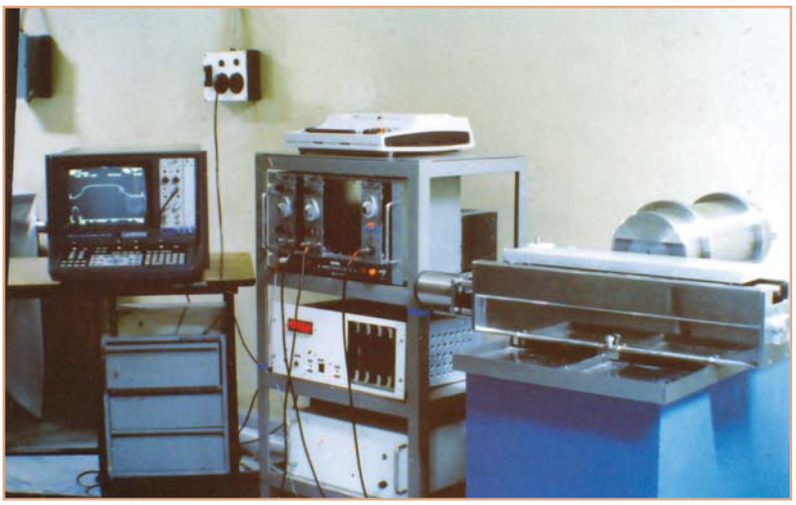

Fig. 3 : Passive gamma scanner for FBTR fuel pin

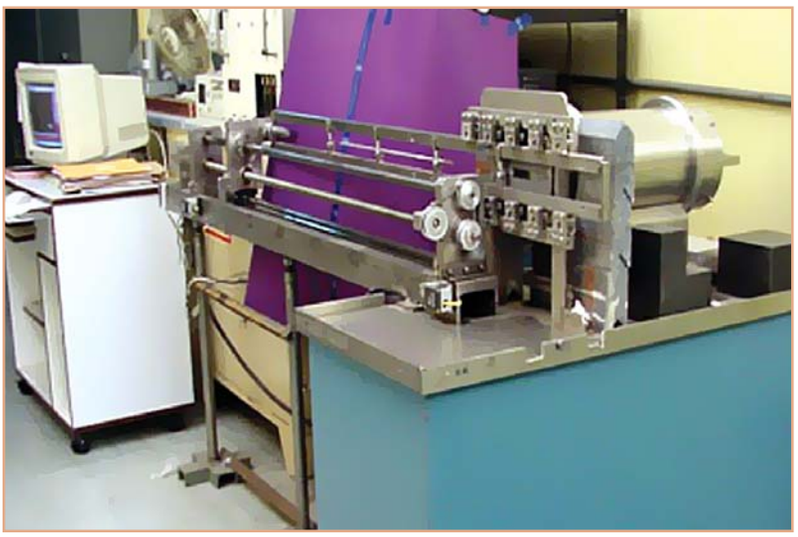

Fig. 3a : FBTR fuel pin scanner adapted to scan longer fuel pins

is shown in Fig. 3. Fig. 3a shows the FBTR scanner, modified to be adapted for the scanning of longer fuel pins. A differential measurement of plutonium gamma ray activity, using a 3"x3" NaI(Tl) detector is performed, by moving the fuel pin (mounted on the cassette) with a uniform speed in front of the detector with a suitable collimator and recording the activity in a multi-channel analyzer in multi-scale mode. A typical activity profile is shown in the Fig. 4. The uniformity of enrichment in the fuel pellets is observed by the plateau of the activity profile, while the active stack length (L) is estimated by

L(mm)=FWHM(channels)*dwell-time(s)*speed(mm/sec).

The accuracy obtainable in the measurement of the active fuel stack, depends upon the precision of speed of movement, width of the collimator and the FWHM. The specified accuracy of estimating the active length to better than 0.5% has been achieved, using the gamma scanner. As only the active fuel stack is examined by PGS, AGS is used to examine the internal arrangement of the hardware components in the FBTR fuel pin [2]. A gamma source, ^{57}Co, is on the opposite side of the detector, so that, the fuel pin is between the gamma source and the detector. Fig. 5 is a typical absorption profile of a fuel pin. The absorption being distinctively different for all the stainless steel hardware, these are clearly distinguished from the fuel pellets. The insulation pellet is distinguished by the dip in the activity profile, before the active fuel stack. The absorption of the gamma-rays in the (U,Pu)C active fuel stack, is actually greater than for the insulation UC pellets, but due to gamma radiation from the fuel itself, the absorption profile of gamma activity appears to be less than for the insulation pellets. A gamma scanning system has been developed, in which the detector and source are moved simultaneously, while holding the fuel pin and rotating it in position if required. The major advantage in this being, the total movement of the detector is

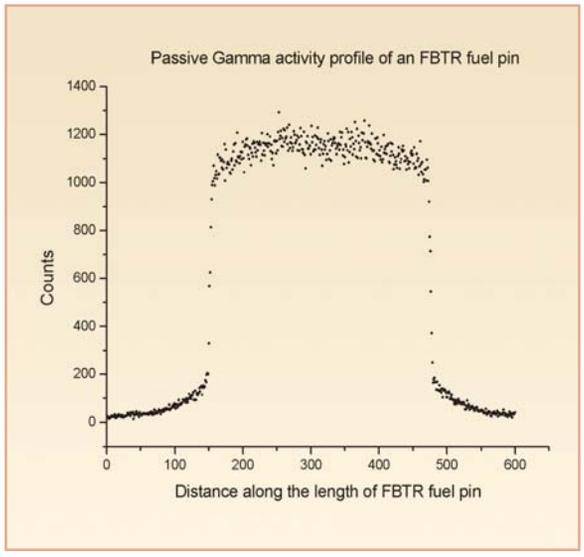

Fig. 4. : Gamma-ray activity profile of a typical fuel pin

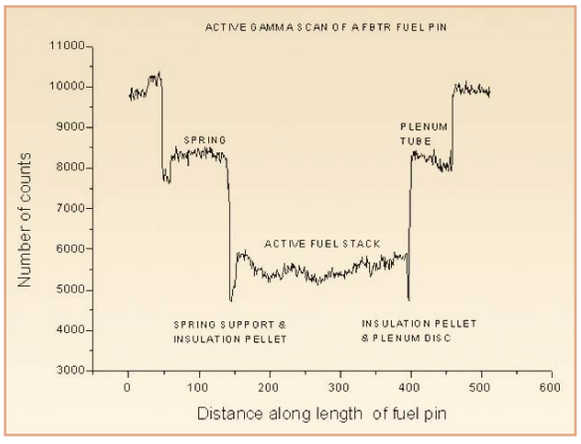

Fig. 5 : A typical activity profile of an active gamma scan of an FBTR fuel pin

limited to the length of the fuel pin as compared to the earlier scanner, in which twice the length of the fuel pin has to be provided to move the pin in front of the detector. Fig. 6 shows a picture of the scanner.

Fuel densitometry

The gamma scanning system was used as a fuel densitometer, to observe and measure the variation of the fuel density distribution, along the length of fuel rod. A gamma absorption fuel densitometer, for measuring the fissile material density and uniformity in a fuel pin, is based on analyzing the transmission gamma ray intensity.

The extent of attenuation of gamma rays while passing through matter, depends on the atomic number (Z) of the material, its density (ρ) and path length (x). The intensity of the transmitted gamma rays (I) of a given energy, is related to the initial intensity (I_0) and the mass attenuation coefficient (μ) as

$$I = I_0 e^{-\mu\rho x}$$

The mass attenuation coefficient is related to r and therefore the transmitted gamma ray intensity, I, is used, to arrive at the density of the fuel pin that is scanned.

Cobalt-57 was used as the gamma ray source and experimental fuel pins were scanned. The feasibility studies indicated that, the density distribution in the pin and its active length could be reliably measured using this system. The averaged values were used to calculate the density corresponding to each measurement and a typical profile is shown in Fig.7. Analysis of this profile gives the fuel column length and the density of the fuel, along the length of the fuel column. Active length of the fuel pin is calculated, using the Full Width at Half Maximum (FWHM) of the profile, as described earlier.

It was required to measure the activity profile with an accuracy better than 15% between neighbouring points of the fuel element and the length of the active stack, with an accuracy better than 0.5%. The measurement accuracy required was due to a stringent specification on the total weight, to be determined, of the fissile element available in the fuel element. Feasibility experiments were performed using this gamma scanner, specially fabricated for these experiments, to arrive at the optimum parameters such as speed at which the fuel pin should be moved, the collimator

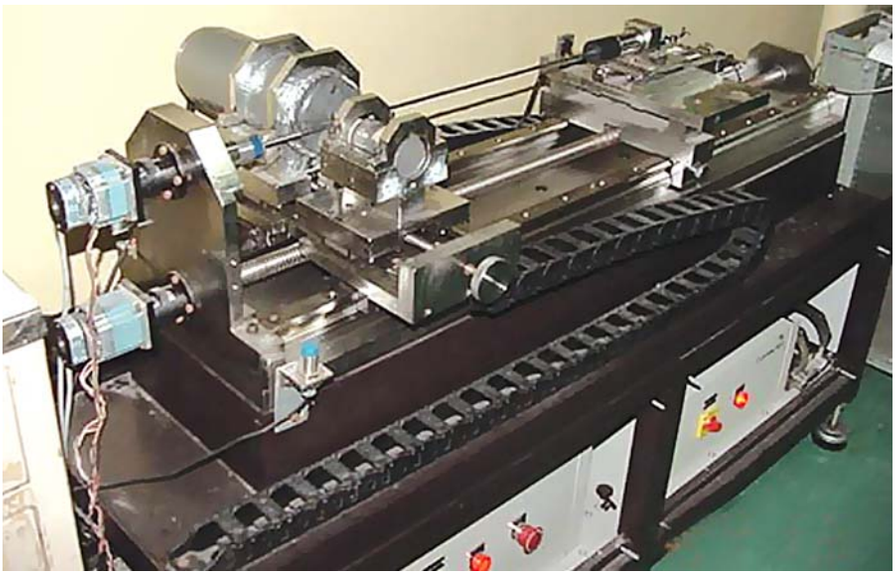

Fig. 6 : Gamma scanning system with detector and source moving simultaneously. The pin can be rotated at variable speeds.

dimensions and the dwell time in the MCS mode. Typically, fuel pins of about a meter length and diameters of about 6mm were scanned using this system. The density distribution is shown in Fig. 8. To correct for the attenuation in the clad material, a typical clad tube was also scanned and the profile is given in Fig. 9. Using this set of data, density of the fuel pin could be measured with accuracy better than 5 %.

In order to identify the pins with varying densities, three segments of different densities were scanned and Fig. 10 shows the obtained results. From this it was concluded, that the density variation of even 5% could be measured reliably with this system. This system also can be used to measure pins with different materials and Fig. 9 shows the difference in the profiles of identical segments with empty tube, gadolinium and fissile material.

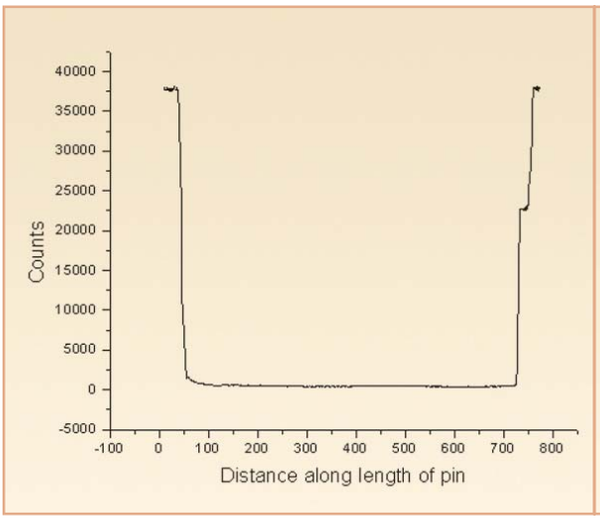

Fig. 7: Density calculation : a typical profile

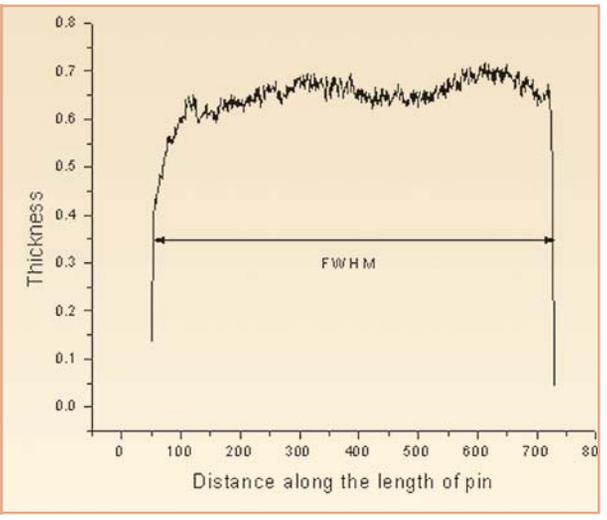

Fig. 8: Density distribution

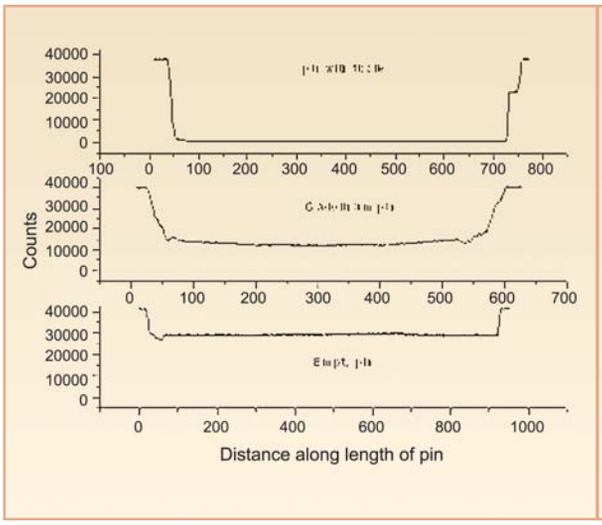

Fig. 9 : difference in the profiles of identical segments

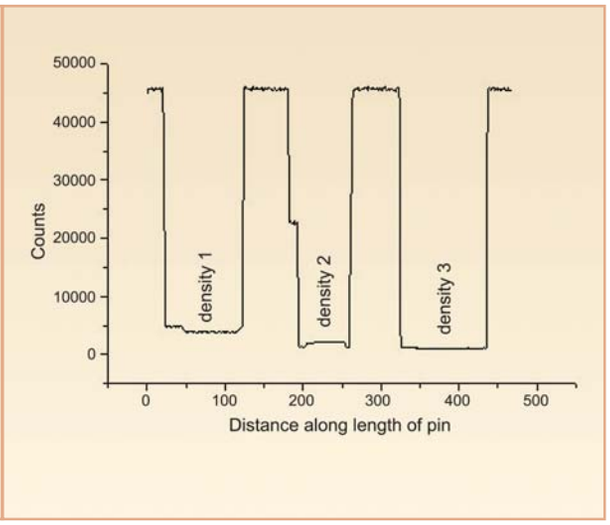

Fig. 10: Scan results of three segments of different densities

The above described feasibility experiments indicate, that the density profiles and the active length can be reliably measured, with this scanner. The optimum parameters were established.

Gamma scanning of BWR MOX fuel pins

Passive Gamma Scanning of three-meter long BWR MOX fuel pins has been carried out at AFFF [3]. The fuel pin scanner (4m long) at AFFF consists of a mechanical system housing ten fuel pins at a time, moving them one at a time in front of a 3"x3" NaI(Tl) detector (Fig 11). The entire system is fully automated. The energy window was set from 300 kev to 450 keV, to cover prominent gamma rays

Fig. 11 : MOX fuel pin scanner

emitted by Plutonium, using a single channel analyzer.

The configuration of BWR MOX bundle is based on three different enrichments of PuO_2 viz; 0.9%, 1.55% and 3.25%, which are commonly referred as low, medium and high enrichments. The system was calibrated with standard fuel pins with pellets of different compositions and a linear relationship was obtained between count rate and PuO_2%.

The main objectives are to confirm that a pin has the right enrichment level as indicated by its coded number and that there is no pellet of a different enrichment, also known as a rogue-pellet or anomalous-pellet, within the stack. PGS has been effective in not only monitoring these aspects but also in the study of many more details like variation of composition, presence of agglomerates. Fig 12 presents the calibration graph, typical scans of BWR MOX pins of low, medium and high enrichment and high enrichment pin with a medium enrichment in the stack.

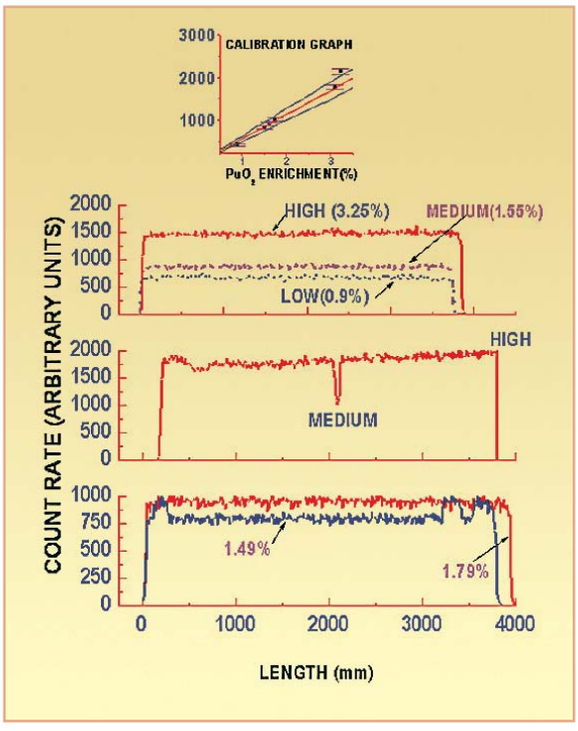

Fig. 12 : Gamma scans of BWR MOX fuel pins

A detection sensitivity of 0.2% variation in enrichment of PuO_2 in thermal reactor fuels, using a conventional detector, has been obtained. It is possible to improve the sensitivity of detection of variation in enrichment, using a better counting geometry and specifically designed detectors and collimators[4]. The use of a through well NaI(Tl) detector (annular) has improved the sensitivity of the system and it has been used for gamma scanning of PHWR MOX pins, containing pellets with 0.4% PuO_2. A compositional variation of 0.02% absolute has been demonstrated at AFFF for PHWR MOX fuel pins(Fig. 13). It is also possible to detect the presence of PuO_2 clusters (about 1mm size) in the fuel pellets **[5]**.

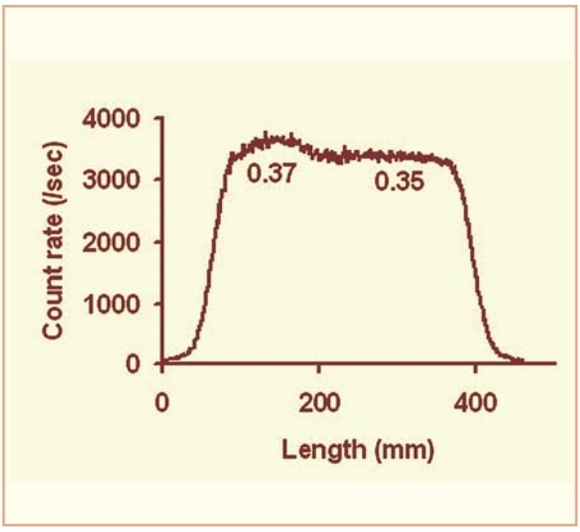

Fig13 : Gamma scan of a PHWR MOX fuel pin

PFBR MOX experimental fuel pins

MOX fuel pins for a 37 element PFBR experimental subassembly, for irradiation in FBTR, were fabricated at AFFF. The composition of the fuel was $(0.71U\text{-}0.29Pu)O_2$ with 53.5 % enrichment in U^{233}. The stack consisted of 240 mm MOX stack with one natural UO_2 pellet on either end of the stack. The stack was loaded in D9 clad tube and welded at both ends by end plugs.

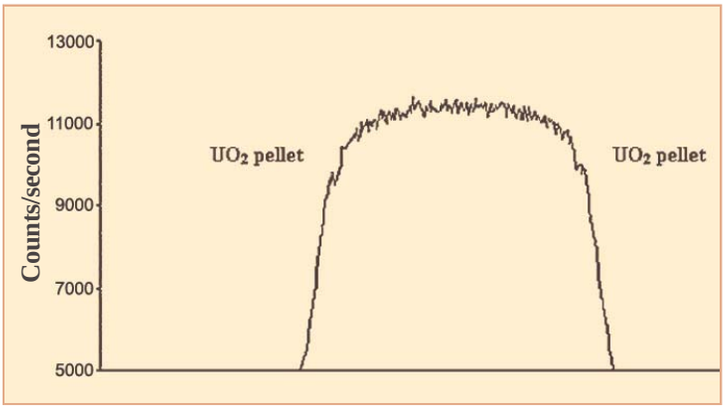

Fig. 14 : Gamma scan of MOX pin for Experimental PFBR assembly

The Gamma Scanner was used to inspect the experimental fuel pins, to check their correct loading. All the experimental pins were scanned using 3"x3" NaI(Tl) detector A typical scan of the experimental PFBR MOX pin is shown in Fig. 14 depicting the presence of insulation pellets inside the pin.

Gamma scanning of PFBR fuel pins containing 21% and 28 % PuO_2 are in progress, with the gamma scanner using annular detector. It was possible to estimate average PuO_2 content of PFBR MOX pins, with an accuracy of +/-0.1% .

Conclusions

Gamma scanning techniques provide a very simple and useful means, of inspecting the characteristics of a nuclear fuel stack, in a fuel element, nondestructively. It has been effectively used to monitor the mixed carbide FBTR fuel elements, fabricated at the Radiometallurgy Division and plutonium based MOX fuel elements of various types made at the Advanced Fuel Fabrication Facility, BARC. The development and fabrication of gamma scanners has been the effort of very many people. This work begun in the early eighties for MOX fuels and has expanded to encompass, as an inspection tool, all the nuclear fuels being developed and fabricated in BARC, for different reactors and applications.

Acknowledgement

The work described in this article is the result of the efforts of a large number of colleagues from Radiometallurgy, Advanced Fuel Fabrication Facility, Radiochemistry and Reactor Control Divisions and our grateful acknowledgements to all of them.

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BRIEF REPORT OF "SECOND SUPERVISORY TRAINING PROGRAMME ON SPENT FUEL REPROCESSING AT BARC FACILITIES, KALPAKKAM"

The supervisory training programme on Spent Fuel Reprocessing was designed and formulated for the supervisors, who are associated with various aspects of Spent Fuel Reprocessing and are working in reprocessing plants, other units and projects of NRG, and either have not received any formal training or had received training about 10-12 years ago. The first supervisory training programme on Spent Fuel Reprocessing, in this series, was conducted at BARC, Trombay in August 2007.

The Second Supervisory Training Programme in this series was conducted at the Centralized Waste Management Facility (CWMF), Kalpakkam, between 13-24 Oct. 2008.

Human resource is the best resource in any organization. Training and periodic retraining help to keep the human resources aware about the modernization and updating of technology. In any organization, supervisors are the back bone and provide links between the management and the working force. Normally, the supervisors working in various units / facilities / plants of Nuclear Recycle Group and engaged in various works, are experts in their own fields. Adequate training has been imparted to the supervisors, for carrying out various activities. However in earlier cases, many of the supervisors did not received formal training. The training programme on a particular subject, like Spent Fuel Reprocessing, gives a complete acquaintance and familiarization of that subject, in detailed way for various aspects.

Mr. R.G.Yeotikar, Officer in Charge, Training, NRG, briefing about the training programme and the subjects on the occasion of Inaugural function. Others on the dais are Dr. (Ms.) S.S. Raj, Superintendent. ACSS, CWMF, Kalpakkam; Dr. P. K. Sinha, Plant Superintendent, CWMF, Kalpakkam; Mr. S. Basu, Facility Director, BARCF, Kalpakkam and Associate Director, Projects, NRG, BARC, Trombay; Mr. P. K. Dey, Head, Fuel Reprocessing Division, BARC, Trombay and Mr. S. K. Munshi, Chief Superintendent, RF, PP, BARC, Trombay.

The inauguration of this training programme was done on 13th October 2008, at the Raja Ramanna Auditorium, Kalpakkam. In the inaugural programme, Dr. P.K. Sinha, PS, CWMF, welcomed the dignitaries and participants at Kalpakkam. Thereafter Mr. R.G. Yeotikar, Officer-in-Charge, Training and organizer of this programme, briefed about the training programme and introduced the syllabus of various subjects and their importance. He has also explained the importance of addition of subjects on aspect of "reprocessing of spent fuel, from thorium fuel cycle," apart from radiation protection and fire and industrial safety. The inaugural function was graced by Mr. S. Basu, Facility Director, BARCF, Kalpakkam & Associate Director, Projects, NRG; Mr. P.K. Dey, Head, Fuel Reprocessing Division; Mr. S. K. Munshi, CS, RF; Mr. Amitava Roy, PO, NRGP; Mr. P. K. Sinha PS, CWMF; Dr. P. M. Satya Sai, NRGP(K) and many senior officials of NRG Kalpakkam. Vote of thanks was proposed by Dr. (Ms.) S.S. Raj, Superintendent, ACS, CWMF.

After inauguration, Mr. P.K. Dey, Head, Fuel Reprocessing Division, presented an invited talk on the subject "Basic philosophy for spent fuel reprocessing and future perspective". In his talk, he explained all aspects related to spent fuel reprocessing, considering the closed cycle fuel programme of India. This included, type of fuel and cladding material, types of reactors, generation of spent fuel and necessity for reprocessing of spent fuel including thorium-based fuel. He also emphasized on how the reprocessing plants in India are safe with respect to general safety, radiation safety and criticality aspects. Thereafter Mr. Amitava Roy, PO, NRGP(K), has given the account of various upcoming reprocessing projects of NRG which are at different stages of construction / commissioning at Trombay, Tarapur and Kalpakkam. This was followed by the lecture of Mr. S. K. Munshi, who has highlighted the processes adopted for spent fuel reprocessing in India.

Dignitaries, invitees and participants during inaugural function of Second Supervisory Training Programme on Spent Fuel Reprocessing

The training programme was designed and organized by Mr. R. G. Yeotikar, Officer-in-Charge, Training, NRG and conducted and coordinated by Dr. (Ms.) S.S. Raj, Supdt. ACS, CWMF, Mr. P.T. Hariharan, CWMF, Kalpakkam and their team. Mr. H.N. Mishra and Mr. P. Patange of Training and Qualification Cell, NRG have coordinated with various faculty members at Head Office and with Dr. (Ms.) S.S. Raj, for effective implementation of lecture schedule. About 40 participants attended this course. They have been given this training for complete acquaintance of various aspects of spent fuel reprocessing. They were junior engineers, supervisors and senior technicians working in reprocessing and waste management plants / facilities and in projects from Trombay, Tarapur and Kalpakkam. The training programme was carried out by way of classroom lectures, demonstrations and visits to various plant / facilities at Kalpakkam, such as Centralized Waste Management Facility (CWMF), Kalpakkam Reprocessing Plant (KARP), Madras Atomic Power Station (MAPS) and Fast Breeder Test Reactor (FBTR). Faculty members, who are specialists in their fields with many years of experience, were invited from all three sites of NRG and from AFD, ROD, IHSS, Hospital, Fire Station, etc., to deliver lectures.

This training programme covered various aspects of nuclear fuel, spent fuel and spent fuel reprocessing. This included philosophy, fuel fabrication, generation of spent fuel, transportation, spent fuel storage, different steps for reprocessing, various auxiliary systems in reprocessing plants, flow sheets and process schematics, for conversion of oxides of Pu and U, analytical requirements for process control, future / advanced techniques for reprocessing, etc. The programme also covered waste management activities at Kalpakkam, details of upcoming reprocessing projects of NRG which are at different stages of construction / commissioning at Trornbay/Tarapur/ Kalpakkam, important aspects of radiation protection, industrial safety, fire safety and instrumentation.

The certification ceremony and valedictory function was held on 24 Oct. 2008 and was graced by Mr. P.V. Kumar, Project Manager, FRFCF, IGCAR; Dr. P. K. Sinha, PS, CWMF; Dr. P. M. Satya Sai, NRGP(K); Mr. K. Agarwal, NRGP, Trombay, Mr. S.B. Patil, HCD&ES and many senior officials from NRG, Kalpakkam. The feedback: about the subjects selected for training, plant visits and overall training programme, was taken from all the trainees for improvement of the future training programme. Mr. R. G. Yeotikar, Officer-in-Charge, Training, answered and responded to this feedback. Thereafter certificates were awarded to all the participants. Dr. (Ms.) S.S. Raj, Supdt. ACS, CWMF, gave vote of thanks after the valedictory function.

THEME MEETING ON "SAFETY AND SECURITY IN TRANSPORT OF NUCLEAR AND RADIOACTIVE MATERIAL"; HELD DURING 29-30, JUNE, 2009

BARC Safety Council Secretariat organized a Theme Meeting on "Safety and Security in Transport of Nuclear and Radioactive Material" on 29th and 30th June, 2009, in the Central Complex auditorium, BARC. The theme meeting was sponsored by the Board of Research in Nuclear Sciences (BRNS). Dr. Srikumar Banerjee, Director BARC, inaugurated the meeting and released the pre print volume of invited talks, published by BSC Secretariat. In his inaugural address, Dr. Banerjee emphasized the need for stringent regulatory control, to ensure safety and security of radioactive material during transport. Mr. H.S. Kushwaha, Chairman BSC and Director HS&EG, delivered the Keynote address. Mr. Kushwaha gave a detailed presentation on the regulatory requirements to be met, for the transport of radioactive material, present status and the challenges ahead.

Dr. S. Banerjee, Director, BARC inaugurating the theme meeting

Dr. D.N. Sharma, Member Secretary BSC and Head RSSD, presented the highlights of the theme meeting. Dr. K.L. Narsimharao, Convener organizing committee, welcomed the participants. Mr. R.P. Hans, Co-convener organizing committee, proposed the vote of thanks.

About 165 delegates from DAE units and non-DAE institutes like ARAI, IIT, DRDO etc., participated in the theme meeting. There were six technical sessions, in which twelve invited talks, on different aspects of transportation of nuclear and radioactive materials, were delivered by experts in the field. The topics included safety, security and regulatory aspects of transportation, design, testing and certification of transport containers, "transport of special nuclear material, vitrified high level radioactive waste, radioisotopes, package testing etc.

The Theme Meeting ended with a panel discussion where issues raised by the participants during the meeting, were addressed. Topics like: guidelines for Quality Assurance in package design, Toppling of the cask during transport, Interaction between various DAE agencies for collective dose estimation, Lead slumping in lead-shielded casks etc. were discussed during the panel discussion.

FORTHCOMING CONFERENCE

International Conference on Sol-Gel Processes for Advanced Ceramics (SGPAC-2009)

The above conference has been organized by IGCAR, the Materials Research Society of India (MRSI) Kalpakkam Chapter and the Indian Ceramic Society (InCerS) Tamilnadu Chapter. Sponsored by BRNS, SGPAC-2009 will be held at Kalpakkam, from Oct. 11-14, 2009.

The Technical Programme includes plenary and invited talks as well as oral and poster presentations, on the following topics :

i) Sensor materials; ii) Glasses and glass fibers; iii) Coatings and thin films; iv) Bioceramics; v) Nuclear ceramics; vi) Aerogels and porous ceramics; vii) Engineering ceramics; viii) Nanoceramics; ix) Ceramic fibres; x) Process design & modeling

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भा.प.अ. केंद्र के वैज्ञानिकों को सम्मान
BARC SCIENTISTS HONOURED

एम. महापात्रा, आर.एम. कदम, बी.एस. तोमर, आर.के. मिश्रा, सी.पी. कौशिक, कंवर राज, एस.वी. गोडबोले तथा वी.के. मनचंदा द्वारा लिखित " फोटोल्यूमिनिसेन्स इन्वेस्टिगेशन्स ऑफ आरई (ईयू एन्ड जीडी) आयन कंटेनिंग ट्रॉम्बे वेस्ट ग्लास" नामक शोध-पत्र को 19-21 फरवरी 2009 के दौरान सैंट्रल ग्लास एन्ड सिरामिक रिसर्च इंस्टिट्यूट, कोलकाता में आयोजित नैशनल कॉन्फ्रेंस ऑफ फोटोल्यूमिनिसेन्स एन्ड इट्स एप्लिकेशन्ज़ (एनसीएलए-2009) की परिचर्चा में तृतीय श्रेष्ठ पोस्टर पुरस्कार प्रदान किया गया।

A paper entitled "Photoluminescence Investigations of RE (Eu and Gd) ion containing Trombay Waste Glass" by M. Mohapatra, R.M. Kadam, B.S. Tomar, R.K. Mishra, C.P. Kaushik, Kanwar Raj, S.V. Godbole and V.K. Manchanda received the Third Best Poster Prize at the National Conference of Luminescence and its Applications (NCLA-2009), held at Central Glass and Ceramic Research Institute, Kolkata, during 19-21 February, 2009.

Mr. M. Mohapatra

श्री मनोज महापात्रा ने उत्कल विश्वविद्यालय से इनॉरगेनिक रसायन विज्ञान में एम.एससी प्राप्त करके, भाभा परमाणु अनुसंधान केंद्र के प्रशिक्षण विद्यालय के 46वें बैच में प्रवेश किया। तत्पश्चात् इन्होंने रेडियोकेमिस्ट्री प्रभाग के स्पेक्ट्रोस्कोपी अनुभाग में प्रवेश किया। इनकी अनुसंधान रुचि के

क्षेत्र में नाभिकीय अकृष्ट भण्डार हेतु पदार्थो में विकिरण उत्प्रेरित स्पेक्ट्रमदर्शी बदलाव तथा इससे संबंधित गतिविधियों की खोज भी शामिल है।

Mr. Manoj Mohapatra did his M.Sc. (Inorganic Chemistry) from Utkal University and joined the Chemistry discipline of 46th batch of BARC Training School. Subsequently he joined the Spectroscopy Section of Radiochemistry Division. His main area of research is spectroscopic investigation of radiation induced changes in materials, used for nuclear waste storage. He is also actively involved in the chemical quality control of nuclear fuels and strategic materials and its related activities.

Dr. R.M. Kadam

डॉ. आर.एम. कदम ने मुंबई विश्वविद्यालय से जैव रसायन में एम.एससी प्राप्त करके भाभा परमाणु अनुसंधान केंद्र के प्रशिक्षण विद्यालय के 27वें बैच से प्रशिक्षण प्राप्तकर रेडियो रसायनिकी प्रभाग में कार्यभार संभाला। पूर्वोक्त विश्वविद्यालय से वर्ष 1992 में पीएच.डी प्राप्त करके इन्होंने बीओवाइएससीएएसटी के अधीन लिन्सशोपिंग, स्वीडन विश्वविद्यालय से अनुसंधान स्नातकता प्राप्त की। आप अनुचुंबकीय अनुनाद एवं इससे संबंधित असाधारण घटनाओं के क्षेत्र के विषेशज्ञ हैं। समीक्षा किए हुए पत्रिकाओं में इनके प्रकाशन 100 से भी अधिक हैं। इनकी वर्तमान रुचियों में अनुचुंबकीय अनुनाद एवं इससे संबंधित असाधारण घटनाओं की खोज, स्वतंत्र सुधारवादी प्रणाली की आण्विक गतिशीलता, विभिन्न अजैव प्रणालियों में ईपीआर मात्रामिति खोज एवं लोह चुंबकत्व भी शामिल हैं।

Dr. R.M. Kadam joined the Radiochemistry Division, BARC in 1984, after completing M.Sc. from Mumbai University in Organic Chemistry and graduating from 27th batch of BARC Training School. He completed his PhD from the same university in 1992 and did his Post Doctoral research at University of Linshoping, Sweden under BOYSCAST fellowship. He is an expert in the field of paramagnetic resonance and its related phenomena. He has more than 100 peer reviewed journal publications to his credit. His current fields of interest include EPR investigations of radiation induced changes in glass matrices, molecular dynamics of free radical systems, EPR dosimetric investigations and ferromagnetism in various inorganic systems.

Dr. B.S. Tomar

डॉ. बी.एस. तोमर ने प्रशिक्षण केंद्र के 25वें बैच से स्नातकीकरण करके वर्ष 1981 मे भाभा परमाणु अणुसंधान केंद्र के रेडियोरसायनिकी प्रभाग में कार्यभार संभाला। अपने बैच में उत्कृष्टता प्राप्त करने पर इन्हें होमी भाभा पुरस्कार से सम्मानित किया गया। इन्होने मुंबई विश्वविद्यालय से वर्ष 1990 में पीएच.डी की डिग्री प्राप्त की। ये अतिथि प्राध्यापक की हेसियत से वर्ष 2007-2008 के दौरान टेक्निकल यूनिवर्सिटी डेल्फट, निदरलेंडस् गए थे। सामान्य एवं नाभिकीय विखंडन में नाभिकीय रसायनिकी, नाभिकीय प्रतिक्रियाएं, क्षुब्ध कोणीय पारस्परिकता, आयन किरण विशलेशन एवं विशेषतया एक्टिनाइडस का जाति उद्भवन तथा विखंडन उत्पादन इनकी अनुसंधान रुचि में शामिल हैं। आप मुंबई विश्वविद्यालय के पीएच.डी निर्देशक तथा होमी भाभा नैशनल इंस्टिट्यूट के प्राध्यापक भी हैं।

Dr. B.S.Tomar joined the Radiochemistry Division in 1982 after graduating from the 25th batch of BARC Training School in 1981. He is a recipient of the Homi Bhabha Prize for topping his batch. He obtained his Ph.D. degree from Mumbai University in 1990. As a Visiting Professor, he visited Technical University Delft, Netherlands during 2007-2008. His areas of interest include Nuclear Chemistry in general and Nuclear Fission, Nuclear reactions, Perturbed Angular

Correlation, Ion Beam Analysis and Speciation of actinides and fission products in particular. He is a Ph.D. guide of University of Mumbai as well as Professor of Homi Bhabha National Institute.

Dr. R.K. Mishra

डॉ. आर.के. मिश्रा अपशिष्ट प्रबंधन सुविधाएं प्रभाग की प्रणाली नियंत्रण प्रयोगशाला ट्रॉम्बे के साथ सक्रिय रूप से सहयोजित हैं तथा रेडियो सक्रिय विभिन्न अपशिष्ट के प्रबंधन प्रणाली को विश्लेशनात्मक समर्थन देने में व्यस्त हैं। इनकी अनुसंधान रुचि के क्षेत्र में विभिन्न प्रकार के पीएचडब्ल्यूआर, एफबीआर, एवं एएचडब्ल्यूआर से उत्पन्न अपशिष्ट को अनुकूल बनाना, दीर्घकालीन कांचाभ अपशिष्ट आकार अनुकृत भंडार की परिस्थितियों का मूल्यांकन एनएम आर,आइआर, रमण स्पेक्ट्रोस्कोपी एवं एक्स-रे आधारित तकनीकों द्वारा कांच के निर्माण स्पष्टीकरण भी शामिल हैं।

Dr. R.K. Mishra is actively associated with Process Control Laboratories of Waste Management Facilities, Trombay and engaged in providing analytical back up to different processes for management of radioactive wastes. His main area of research is development and characterization of various matrices, for conditioning of different types of wastes, generated from PHWRs, FBRs and AHWRs, long term evaluation of vitreous waste forms under simulated repositories conditions and structure elucidation of glasses by NMR,IR, Raman Spectroscopy and X-ray based techniques.

डॉ. सी.पी. कौशिक ने भाभा परमाणु अणुसंधान केंद्र के प्रशिक्षण केंद्र के 28वें बैच में सफलता प्राप्त करके वर्ष 1985 में अपशिष्ट प्रबंधन प्रभाग में कार्यभार संभाला। इस समय आप अपशिष्ट प्रबंधन सुविधाएं, ट्रॉम्बे में अधीक्षक का उत्तरदायित्व संभाल रहे हैं। पिछले दो दशकों से ये विभिन्न रेडियो सक्रिय अपशिष्टों को परिस्थितियों के अनुसार बनाने वाले सांचे के विकास तथा प्लांट स्केल में कार्यान्वित करने में व्यस्त हैं। आप अपशिष्ट एवं अपशिष्ट प्रकारों के चरित्रांकन हेतु भी उत्तरदायी हैं।

Dr. C.P. Kaushik

Dr. C.P. Kaushik joined the Waste Management Division in 1985, after successful completion of 28th batch of BARC Training School. Presently he is shouldering the responsibility of Superintendent at Waste Management Facility, Trombay. He is engaged in development of matrices for treatment/conditioning of different types of radioactive wastes and its implementation on plant scale, for more than two decades. He is also responsible for characterization of waste and waste forms.

Mr. Kanwar Raj

श्री कंवर राज, उत्कृष्ट वैज्ञानिक, भाभा परमाणु अणुसंधान केंद्र के अपशिष्ट प्रबंधन प्रभाग के अध्यक्ष हैं। आप रुड़की से रसायनिकी इंजीनियरी एवं आइआइटी से आनर्स स्नातकता के प्राप्तकर्ता हैं तथा देशभर से विकिरण स्त्रोतों से डीएई सुविधाएं, ट्रॉम्बे, तारापुर एवं कल्पाकम से उत्पन्न विभिन्न रेडियो सक्रिय अपशिष्टों के सुरक्षित प्रबंधन के उत्तरदायी हैं।

Mr. Kanwar Raj, Outstanding Scientist, is Head, Waste Management Division, BARC. He is an Engineering graduate with Honours from IIT, Roorkee in Chemical Engineering and is responsible for safe management of different types of radioactive wastes generated from DAE facilities at Trombay, Tarapur & Kalpakkam and spent radiation sources from all over the country.

डॉ. एस.वी.गोडबोले ने वर्ष 1974 में मुंबई विश्वविद्यालय से एम.एससी (भैतिकी विज्ञान) की डिग्री प्राप्त की। इन्होने वर्ष 1975 में रेडियो रसायनिकी प्रभाग का कार्यभार संभाला, तथा वर्ष 2002


Dr. S.V. Godbole

में नैशनल तैवान विश्वविद्यालय से स्नातकता ली। ये नाभिकीय पदार्थ एवं ठोस अवस्था स्पेक्ट्रोसकॉपी के गुणवत्ता नियंत्रन क्षेत्र के विशेषज्ञ हैं। आप मुंबई विश्वविद्यालय तथा होमी भाभा नैशनल इंस्टिट्यूट के मान्यता प्राप्त भैतिक विज्ञान के निर्देशक हैं। इस समय आप रेडियो रसायनिकी प्रभाग के स्पेक्ट्रोस्कॉपी अनुभाग के अध्यक्ष हैं।

Dr. S.V. Godbole received M.Sc. (Physics) degree from Mumbai University in 1974. He joined the Radiochemistry Division, BARC in 1975. He obtained his PhD from Mumbai University in 1991and did his Post Doctoral work at National Taiwan University in 2002. He is an expert in the field of quality control of nuclear materials and solid state spectroscopy. He is a recognized PhD guide in Physics for University of Mumbai and Homi Bhabha National Institute. Currently he is heading the Spectroscopy section of the Radiochemistry Division.


Dr. V.K. Manchanda

डॉ. वी.के. मनचंदा, उत्कृष्ट वैज्ञानिक, वर्ष 2003 से भाभा परमाणु अनुसंधान केंद्र के रेडियो रसायनिकी प्रभाग के अध्यक्ष हैं तथा होमी भाभा नैशनल इंस्टिट्यूट (एचभीएनआइ) के प्राध्यापक एवं रसायनिकी अध्ययन मंडल के सदस्य भी हैं। ये "रेडियोकिमिका ॲक्टा तथा सोलवंट एक्सट्रेक्शन एन्ड आयन एक्सचेंज" के अतिरिक्त विभिन्न अंतर्राष्ट्रीय पत्रिकाओं के सलाहकार मंडल के सदस्य हैं। आप इन्डियन एसोसियेशन ऑफ सेपरेशन सांइटिस्टस एन्ड टेक्नॉलोजिस्टस (आइएनएएसएटी) के संस्थापक अध्यक्ष हैं। इनकी अनुसंधान रुचि में बोरोसिलिकेट कांच पर विकिरण का प्रभाव, नाभिकीय ईंधन का रसायनिकी गुणवत्ता नियंत्रण, लैन्थानाइड एवं एक्टिनाइड समेत संलग्नी दीर्घचक्री जटिल उष्मागतिक, ईंधन गति के पशचंत्य अनुपम एक्टिनाइड से संबन्धित रूपरेखा एवं संयोजनन एवं जलीय वातावरण में एक्टिनाइडस का जाति उदभवन भी शामिल है। अंतर्राष्ट्रीय समीक्षक पत्रिकाओं में 200 से भी अधिक प्रकाशन इनके श्रेय में हैं।

Dr. V.K. Manchanda, Outstanding Scientist, is heading the Radiochemistry Division of BARC since 2003 and is a member of Board of Chemical Studies and Professor of Chemistry at Homi Bhabha National Institute (HBNI). He is a member of the Advisory Boards of several international journals including *"Radiochimica Acta"* and *"Solvent Extraction & Ion Exchange"*. He is the Founder-President of Indian Association of Separation Scientists and Technologists (INASAT). His research interests include; radiation effects on borosilicate glasses, chemical quality control of nuclear fuels, thermodynamics and kinetics of complexes of macrocyclic ligands with lanthanides and actinides, design and synthesis of novel extractants of actinides relevant in the back end of the fuel cycle and speciation of actinides in aquatic environment. He has more than 200 publications in peer reviewed international journals.


Dr. Ms. J. Mohanty

डॉ. (श्रीमती) ज्योतिर्माई मोहंती विकिरण एवं फोटो रसायन प्रभाग, भाभा परमाणु अनुसंधान केंद्र को सुपरमॉलिक्यूलर फोटोरसायन में महत्वपूर्ण योगदान हेतु जापान की केमिकल सोसाइटी के द्वारा "डिसटिंगविश्ड लेक्चररशिप अवार्ड" से सम्मानित किया गया। यह पुरस्कार इन्हें मार्च 27-30, 2009 के दौरान निहोन विश्वविद्यालय, चिबा, जापान में आयोजित सीएसजे एशियन इंटरनैशनल परिचर्चा में केमिकल सोसाइटी ऑफ जापान के अध्यक्ष द्वारा प्रदान किया गया था। डॉ मोहंती भाभा परमाणु अनुसंधान केंद्र के प्रशिक्षण केंद्र के 37वें बैच से हैं। सुपरमोलिक्यूल पर आधारित होस्ट-ग्येस्ट के फोटोफिज़िक्स एवं जैव आन्विक

संयोजन तथा नानाविध प्रायोगिक क्षेत्रों में इनके उपयोग की खोज करना इनकी वर्तमान रुचियों में शामिल हैं।

Dr. (Ms.) Jyotirmayee Mohanty of Radiation & Photochemistry Division, BARC has been conferred the prestigious "Distinguished Lectureship Award" by the Chemical Society of Japan, in recognition of her significant contribution towards Supramolecular Photochemistry. This Award was presented to her by the President, Chemical Society of Japan during the CSJ Asian International Symposium (27th-30th March 2009) held at Nihon University, Chiba, Japan. Dr. Mohanty is from the 37th Batch of BARC Training School. Her present research interests include the studies on the photophysics of supramolecule based host-guest and biomolecular assemblies and exploring their use in diverse applied areas.


Dr. H.N. Ghosh

डॉ. हिरेंद्र नाथ घोष, विकिरण एण्ड फोटो रसायन प्रभाग, भाभा परमाणु अनुसंधान केंद्र को वर्ष 2008 में अल्ट्राफास्ट इन्टरफेशल इलेक्ट्रान ट्रान्सफर डायनामिक्स एवं मोलिक्यूलर एडज़ोरबेट तथा सेमिकंडक्टर एवं नॅनोस्टक्चर्ड़ तथा क्वांटम डोट मेटीरियल्स के अतंर्गत उत्कृष्ट योगदान हेतु इलाहाबाद, भारत के राष्ट्रीय वैज्ञानिक अकादमी के स्नातक (एफ.एन.ए. साइन्स) पद पर चयन किया गया हैं। डॉ. घोष वर्ष 1998 के आइएनएसए सम्मानित युवा वैज्ञानिक हैं तथा वर्ष 2000 में आइएनएसए ए.के.बोस मेमोरियल पुरस्कार से भी सम्मानित हैं। डॉ. घोष ने वर्ष 2004 में एशियन एन्ड ओशेनियन फोटोकेमिस्ट्री एसोसिएशन के द्वारा एपीए का युवा-वैज्ञानिक पुरस्कार भी प्राप्त किया है। इनकी वर्तमान रुचियों में मिड-आइआर एवं टेराहर्ट्ज़ स्पेकट्रोमीटर की रूपरेखा तथा विकास तथा चार्ज ट्रांसफर एवं केरियर रिलेक्ज़ेशन डायनामिक्स इन क्वांटम डोट कोरशल मेटीरियल एन्ड प्रोटोन-कप्पल्ड इलेक्ट्रान ट्रान्सफर रियक्शन यूज़िग अल्ट्राफास्ट स्पेकट्रोसकोपिक टेक्नीक्स भी इनकी वर्तमान रुचियों में शामिल हैं।

Dr. Hirendra Nath Ghosh of Radiation & Photochemistry Division, BARC has been elected as the Fellow of National Academy of Science (F. N. A. Sc.), Allahabad in the year 2008, for his excellent contributions to ultrafast interfacial electron transfer dynamics, between molecular adsorbate and semiconductor nanostructured and quantum dot materials. Dr. Ghosh is an INSA Young Scientist Awardee in the year 1998 and was also awarded INSA A.K. Bose Memorial Award in the year 2000. Dr. Ghosh has also received APA-Prize for Young Scientist Award in the year 2004 from the Asian and Oceanian Photochemistry Association. His current activities focus on design and development of ultrafast mid-IR and terahertz spectrometer, charge transfer and carrier relaxation dynamics in quantum dot core-shell material and proton-coupled electron transfer reaction using ultrafast spectroscopic techniques.


Dr. R.K. Sinha

डॉ. रतन कुमार सिंहा, निदेशक, रियक्टर अभिकल्पन एवं विकास वर्ग तथा अध्यक्ष, अभिकल्पन, निमार्ण एवं स्वचालित वर्ग को मैसूर में आयोजित 7 मार्च 2009 को मैसूर विश्वविद्यालय के द्वारा 89वीं वार्षिक संगोष्ठी में होनरेरी डाक्टरेट की उपाधि से सम्मानित किया गया।

डॉ. सिंहा ने वर्ष 1972 में पटना विश्वविद्यालय से मेकनिकल इंजीनियरिंग की परीक्षा प्रथम श्रेणी में उत्तीर्ण की। भाभा परमाणु अनुसंधान केंद्र के प्रशिक्षण केंद्र के 16वें पाठयक्रम की समाप्ति के पश्चात इन्होंने भाभा परमाणु अनुसंधान केंद्र के रियक्टर इंजीनियरिंग प्रभाग में कार्यभार संभाला। डॉ. सिंहा की कार्य रूपरेखा में नाभिकीय रियक्टरस के ध्रुवा तथा पीएचडब्ल्यूआर के विकास एवं विशेष रख-रखाव की कूलंट चैनल जीवन प्रबन्धन तथा विकास महत्वपूर्ण विचारधारा शामिल है।

गत कई वर्षों से डॉ. सिंहा भाभा परमाणु अनुसंधान केंद्र में थोरियम का उपयोग करने हेतु रूपरेखा एवं विकास के आधर पर नवीन

प्रगतिशील रियक्टरस हेतु कार्यक्रमों का मार्गदर्शन कर रहे हैं। इनमें प्रगतिशील भारी पानी रियक्टर, जो अधिकतर थोरियम से ही ऊर्जा का उत्पादन करते हैं तथा विभिन्न एवं नवीन निष्क्रिय सुरक्षा प्रणाली निहित हैं। आप हाइड्रोजन हेतु भारतीय उच्चताप रियक्टर साभिप्राय रूपरेखा तथा विकास के उत्तरदाई हैं। कार्य के साथ-साथ इन्होंने सघन उच्चताप रियक्टर की रूपरेखा में मार्गदर्शन किया है जो कि भविष्य में अधिकतम उच्चताप रियक्टरों हेतु प्रौद्योगिकी प्रदर्शनकारी में काम आएगें।

डॉ. सिंहा ने विभिन्न पुरस्कार एवं सम्मान प्राप्त किए हैं। इनमें होमी भाभा साइन्स एन्ड टेक्नॉलोजी का पहला पुरस्कार, वास्विक पुरस्कार, इन्डियन न्युक्लियर सोसाइटी पुरस्कार एवं डीएई स्पेशल कंट्रिब्यूशनस पुरस्कार शामिल हैं। इन्हें वर्ष 1998 में इन्डियन नैशनल अकादमी ऑफ इंजीनियरिंग का स्नातक निर्वाचित किया गया।

Dr. Ratan Kumar Sinha, Director, Reactor Design & Development Group and Director, Design, Manufacturing & Automation Group was conferred the Honorary Doctorate of Science by the University of Mysore› in its 89th Annual Convocation held on the 7th March 2009 at Mysore.

Dr. Sinha graduated in Mechanical Engineering from Patna University in 1972, standing first in the University. After completing the 16th Course of BARC Training School› he joined Reactor Engineering Division of BARC. Dr. Sinha's work profile has included core internals for Dhruva and PHWRs, coolant channel life management and development of special repair and maintenance techniques for nuclear reactors.

Since past several years, Dr. Sinha has been guiding the programmes for new advanced reactors under design and development at BARC to utilize thorium. These include, the Advanced Heavy Water Reactor, which produces most of its power from thorium, and has several innovative passive safety systems. He is also responsible for the design and development of the Indian High Temperature Reactor, intended for hydrogen generation. As part of the work, he has guided the design of the Compact High Temperature Reactor, which will serve as a technology demonstrator, for future larger high temperature reactors.

Dr. Sinha has received several awards and honours. These include: the first Homi Bhabha Science and Technology Award, VASVIK Award, Indian Nuclear Society Award and the DAE Special Contribution Award. He was elected a Fellow of the Indian National Academy of Engineering in 1998.

Dr. R. Acharya

डॉ. रघुनाथ आचार्या, रेडियो रसायनिकी प्रभाग भाभा परमाणु अनुसंधान केंद्र ने नाभिकीय एनालिटिकल रसायन में व्यावसायिक उपलब्धियों में विशिष्ट योगदान को मान्यता देने हेतु वर्ष 2008 का इंटरनैशनल कमेटी ऑफ एक्टिवेशन एनालिसिस /मॉडर्न ट्रन्डस इन एक्टिवेशन एनालिसिस (आइसीएए/ एमटीएए) का युवा वैज्ञानिक पुरस्कार (वाइएसए) प्राप्त किया। डॉ. आचार्या को एक प्रशस्ति-पत्र तथा 1000 यूएसडी की नगद राशि का यह पुरस्कार सितंबर 7-12, 2008 को लिसबन, पुर्तगाल में आयोजित न्यूक्लियर एनालिटिकल मेथड्स इन दि लाइफ साइन्सिस (एनएएमएलएस-9) की 9वीं अंतर्राष्ट्रीय सभा में प्राप्त हुआ। युवा वैज्ञानिक प्राप्तकर्त्ता की हेसियत से इनके प्रथम भाषण का विषय एनएएमएलएस-9 था जिसमें " डेवलोपमेंट एन्ड एप्लिकेशन्स ऑफ k_0-बेसड न्यूट्रॉन एक्टिवेशन एनालिसिज़ (एनएए) एन्डप्रोम्प्ट गामा रे एनएए (पीजीएनएए)" है।

डॉ. आचार्या ने भाभा परमाणु अनुसंधान केंद्र के प्रशिक्षण विद्यालय के 37वें वर्ग से रसायनिकी विज्ञान में प्रशिक्षण प्राप्त करके रेडियो रसायनिकी प्रभाग में कार्यभार संभाला। आप हाइ रेज़िल्यूशन गामारे स्पेक्ट्रोमीटरी तथा रियक्टरों के अनुसंधान उपयोग से व्यावहारिक कार्य में व्यस्त हैं। इन्होंने भारत में पहली बार k_0-आधारित एनएए तथा पीजीएनएए बेसड आर एन्ड डी विकास विधि को सामने लाया है। इन्होंने पद्धति को अनुकूल बनाकर बहुघटक रूपरेखा, भूवैज्ञानिक, जीवविज्ञान, वातावरणिक एवं नाभिकीय पदार्थों में उपयोग किया। आप सक्रिय रूप से रसायनिक एनएए द्वारा

आयोडीन एवं आरसेनिक के विशेष गुणों का अध्यन करने में व्यस्त हैं। इस समय आप भाभा परमाणु अनुसंधान केंद्र के फोटिया, में प्रोटॉन किरण के उपयोग से मंद ज़ी अवयव हेतु पार्टिकल इन्ड्यूसड गामा रे एमिशन का माननीकरण में व्यस्त हैं। विभिन्न परिचर्चाओं के समकक्ष समीक्षक पत्रिकाओं में 46 शोध तथा राष्ट्रीय एवं अंतर्राष्ट्रीय सम्मेलनों में 100 से अधिक शोध इनके श्रेय में हैं।

Dr. Raghunath Acharya, Radiochemistry Division, BARC has received the Young Scientist Award 2008 (YSA 2008) of the International Committee of Activation Analysis / Modern Trends in Activation Analysis (ICAA/MTAA) in recognition of his significant achievements in Nuclear Analytical Chemistry. Dr. Acharya received this award consisting of a citation and a cash prize of USD 1000 at the 9th International Conference on Nuclear Analytical Methods in the Life Sciences (NAMLS-9) held during September 7-12, 2008 at Lisbon, Portugal. As a young scientist awardee, he delivered the first talk of NAMLS-9 Conference, in which he gave an overview of "Development and applications of k_0-based neutron activation analysis (NAA) and prompt gamma ray NAA (PGNAA)".

Dr. Acharya has been working in the Radiochemistry Division since 1994 after graduating from 37th batch of BARC Training School in Chemistry discipline. He is actively engaged in R&D work on conventional and k_0-based NAA and PGNAA, using research reactors and high resolution gamma ray spectrometry. He is instrumental in developing k_0-based methods in NAA and PGNAA for the first time in India. He optimized the methodologies and has been applying them for multielement profiles in various samples of geological, biological and environmental origin as well as nuclear materials. He is also actively engaged in speciation studies of elements like iodine and arsenic by chemical NAA methods. Currently he is engaged in standardizing Particle Induced Gamma ray Emission (PIGE) method, for low Z elements using proton beams at FOTIA, BARC. To his credit, he has got 46 papers in peer reviewed journals and more than 100 papers in various national and international conferences/symposia.

FORTHCOMING SYMPOSIUM

National Symposium on Growth of Detector-Grade Single Crystals (NSGDSC-2009)

The Materials Research Society of India (Mumbai Chapter), in association with BARC, has organized the above symposium at the Multipurpose Hall, Training School Hostel, Anushaktinagar, Mumbai, from Nov. 19-21, 2009. The scientific programme of the symposium will comprise of invited talks and select contributory papers. Deliberations would be on the following topics :

Fundamentals of Crystal Growth
Crystal growth simulation
Growth of Large Crystals
Defects in Crystals
Crystal Growth of Novel Materials
Characterization Techniques
Crystallography
Applications of Crystals
Design / Development of Devices
Instrumentation for Crystal Growth

Important Dates:

Manuscript Submission : Sep. 30, 2009
Acceptance by email : Oct. 15, 2009
Registration : Oct. 30, 2009

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