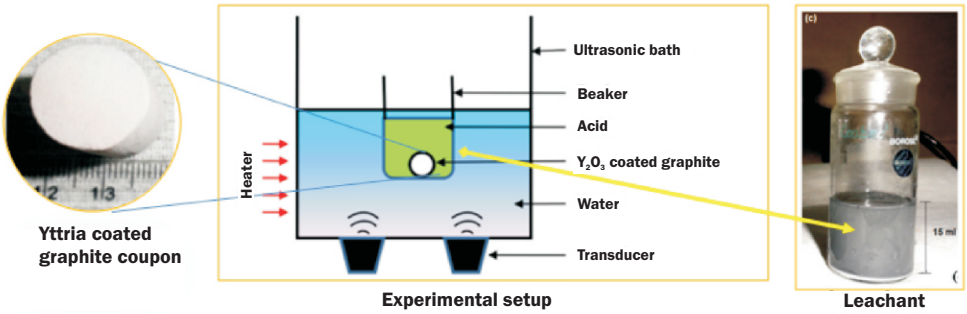
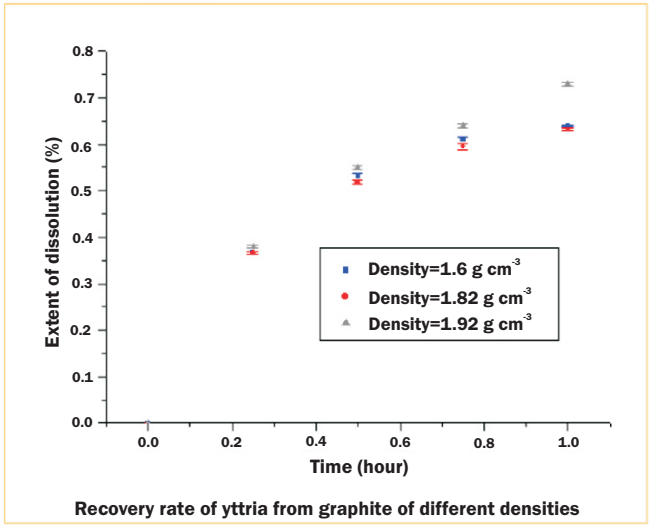
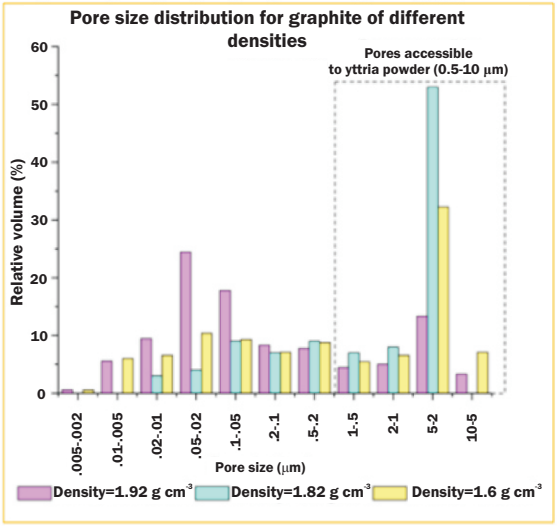
Cavitation-assisted Decontamination of Yttria from Graphite of Different Densities





Recovery rate of yttria from graphite of different densities



Process intensification using ultrasound for yttria coated graphite substrates is established.

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High-density graphite (HDG) is widely used as crucibles and substrates to handle molten refractory nuclear materials viz., uranium and plutonium. It is susceptible to oxidation in atmosphere at temperatures above 500°C, but stable at temperatures around 3000°C in high vacuum. A protective coating on graphite prevents the unwanted chemical interaction between molten metal and carbon, and thus ensures high corrosion resistance and longer service life at the desired operating temperature. The coating also prevents deposition of molten metal on the porous surface. Yttria (Y_2O_3) is widely used as a high temperature coating material on the graphite for nuclear applications. A recent article (Lahiri *et al.*, *'Cavitation-assisted decontamination of yttria from graphite of different densities'*, Ultrasonic Sonochemistry, 2021, **75**, 105520) investigated intensified dissolution of yttria from the coated graphite samples using ultrasound as a non-destructive decontamination technique to recycle the graphite substrate. The parametric study and kinetics of the process was established. Effect of adding oxidant on the kinetics was also studied along with the influence of pore size distribution for graphite of different densities. The outcome of the work is important as this will not only bring down the volume of graphite wastes generated by the nuclear installations, but also to bring down the radiological exposures and environmental pollution caused by its burning.

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