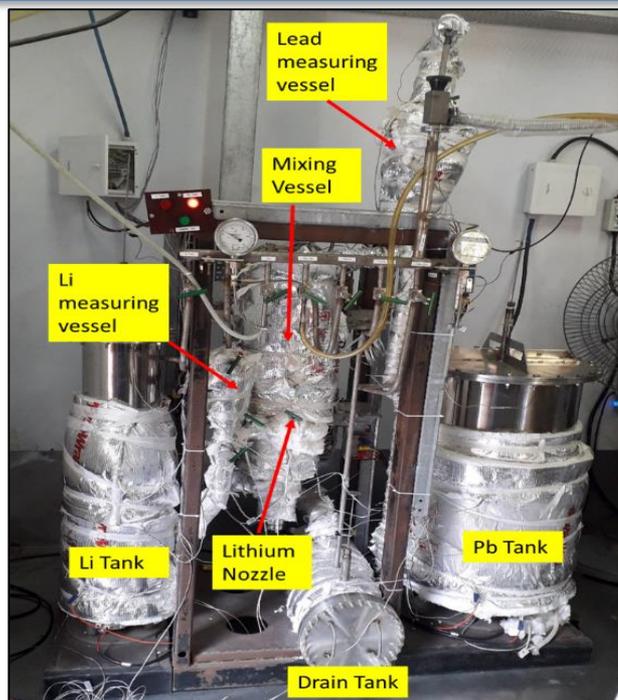


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Development of lead lithium (Pb-16Li) alloy production system and characterization of the produced alloy

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Pb-Li production system at IPR



Pb-16 Li ingots produced at IPR

The lead lithium eutectic (Pb-16Li) alloy, enriched at 90% in ^6Li is a potential candidate as tritium breeder in the liquid metal breeding blanket system of future fusion reactors like ITER and DEMO. It is quite challenging to develop this alloy because the elements lead and lithium have a significant density difference, making it difficult to effectively mix them. This paper discusses the indigenous development of an Pb-16Li production system of capacity 75kg/batch. MHD stirring-based Pb-16Li production system has been in-house developed to cater to the need for Pb-16Li as a process fluid for various Pb-16Li R&D experiments at IPR. A total of $\sim 750\text{kg}$ of Pb-16Li ingots have been produced and characterized to determine the eutectic composition and eutectic temperature. The analytical characterization techniques such as ICP-OES and DSC confirm the eutectic composition of Pb-16at%Li and eutectic temperature in the range of $235\text{-}238^\circ\text{C}$ respectively. The solidification curve of the produced ingots also suggests a melting point of $\sim 235^\circ\text{C}$ confirming the formation of the Pb-16Li. The homogeneity of the produced ingots was ascertained by SEM analysis which indicates the homogeneous microstructure of the produced alloy.

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