

Experimental determination of Sievert's solubility constant and diffusion values for H₂ and D₂ in LiPb eutectic

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Tritium solubility in LiPb eutectic is a key magnitude to assess on T-control at Breeding Blanket (BB) level and for the design of BB auxiliary systems.

Historically, experimental values in current literature show a very large scattering with a broad band of two orders of magnitude. The low value of H-isotopes solubility in LiPb eutectic explain the difficulties for developing accurate instruments sufficiently sensitive to finish with these discrepancies. New absorption-desorption measurements for H₂ and D₂ in the temperature range of (300-500°C) for two different samples (one provided by commercial Stachow and the manufactured at IPUL-labs) are proposed from two different equipments developed at UPV-EHU and CIEMAT (using a commercial equipment manufactured by SETARAM®). Results are compared and discussed. Parasitic effects in these measurements are identified and corrected.

The high Sievert's constant (K_s) values obtained are explained in terms of Li excess in LiPb eutectic, and high diffusivity values compared to Reiter assessment are explained in terms of fluid convection within the samples. Parasitic effects in these measurements are identified and corrected. Experimental results are compared and discussed.