

An innovative pathway for the limitation of gaseous tritium outgassing from fusion reactors waste drums.

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The waste generated by fusion reactors has to obey several criteria including total tritium inventory and outgassing. As a function of the type of waste (very low level waste (VLLW), intermediate level waste short lived (ILW-SL) and intermediate level waste long lived (ILW-LL), fusion reactors do not produce any high activity waste), these criteria are more or less stringent. For instance, ILW-LL specifications are the most severe ones and have a great impact on the cost of the storage [1]. Thus, the treatment of these materials may allow one to declassify the waste, leading to economies on both financial and environmental ways.

Concerning the outgassing issue, several studies has already been carried out, enlightening that three kinds of compounds are able to either convert or trap tritium in an irreversibly way, without any maintenance and at ambient temperature and pressure. Organic compounds and metal hydrides are excluded because of their low thermal resistivity and high reactivity with water, respectively [2], [3].

Consequently, in this paper, we propose an innovative method to convert the most mobile tritiated form HT releasing from waste drums into a less mobile one HTO which will be finally trapped.

In order to be the most representative as possible of the real case, experiments are carried out at ambient temperature and pressure under several hydrogen partial pressures, simulating tritium outgassing from drums.

References.

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