COMPRESSIBILITY STUDY DURING HYDRIDE REACTION OF ZrCo

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The compressibility effect on the hydride reaction of ZrCo, intermetallic compound, was studied by using a visual cell reactor [1]. Volume expansion of the hydride material in the getter bed design is one of major considerations due to a necessity of breathing space during hydriding/dehydriding cycles. The volume expansion or contraction of the getter material, whether it is in hydriding or dehydriding condition, varies with a hydride content ratio to the getter material, micro-powdered particle size distribution of the hydride material, system temperature and pressure conditions and so forth. Sometimes the expanded hydride powder of the getter material should be considered in order to avoid a certain rupture accident or deterioration of the filter plane required for the confinement of the getter material within a controlled geometric bed space. Therefore, the volume expansion of hydride material has to be taken into account for the bed design, since the fragment of micron size ZrCo is swelled enough so that the system volume is significantly expanded. In case of highly compressed condition the hydride reaction is propagated into the bed, whether any void space inside the bed is present or not. Here the possibility of crystal lattice expansion itself must be considered as it is of importance in engineering concept.
In this study the compressibility effect on the hydride reaction of the ZrCo getter material was studied by means of measuring the initial hydriding rate and monitoring through a visual cell. As a result, the initial hydriding rate was closely similar to no pressurized hydride reaction system, however, it had a little effect in a highly pressurized system.

[1] S.-H. Yun et al., Transactions of the Korean Nuclear Society Spring Meeting, Pyeongchang, Korea, May 27-28, 2010.