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Effect of High Temperature Corrosion Tests in Be-liquid Li-V4Ti4Cr Alloy System on Mechanical Properties of Beryllium


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Self-cooled lithium blanket is one of the promising concepts of breeding blanket for future fusion reactor. Beryllium proposed to be used in this design of blanket as a neutron multiplier and moderator for providing the required tritium breeding efficiency. Corrosion behavior of beryllium in liquid Li is important and at the same time not clearly understood aspect of beryllium application in fusion.

Recent experimental results on beryllium corrosion behavior of two modern RF beryllium grades (DIP, TE-56) after testing in Be-liquid lithium - V4Ti4Cr alloy static system for 200-500 hours at temperatures from 600 to 800°C are presented. The influences of test conditions (temperature, duration, lithium purity), beryllium characteristics (microstructure, grain size and chemical composition) and penetration of lithium into beryllium on compressive properties of beryllium are discussed. Compressive properties can be considered as an integral characteristic of grain boundaries weakening that is caused by penetration of lithium into beryllium during corrosion tests. The data obtained show that the stability of modern beryllium grades in lithium is much higher than that for the "old" grades.

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