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Effects of ^{3}He in ErT_2

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Abstract

An overview will be presented of a long-term experimental study of ^{3}He in ErT_2 that has been carried out over the last several years. The goal of the study has been to elucidate the evolution of helium bubbles and their impact on the properties of ErT_2, including swelling and hardening. The helium bubbles that form in ErT_2 have a plate-like morphology and lie on {111} planes. Bubble nucleation is already completed by a He/M ratio of ~ 0.018, and the plate-like bubbles then grow in size until a He/M ratio of ~ 0.3 after which bubble linkage becomes extensive. As the bubbles begin to link, the lattice swelling decreases along with the hardness. The study includes transmission electron microscopy (TEM), X-ray diffraction (XRD), and nano-indentation (NI), and the data have been used as input for concurrent modeling efforts.

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