Ion induced formation of colloids in LiF at 15 K

Schwartz K, Wirth G, Trautmann C, Steckenreiter T
PHYSICAL REVIEW B 56 (1997) 10711-10714

LiF has been irradiated with energetic heavy ions (about 1 GeV) at temperatures between 15 and 300 K. In all cases, the ion tracks exhibited preferential chemical etching. This surprising observation gives clear evidence that the formation of etchable aggregates (Li colloids) takes place even at 15 K, although at such low temperatures all diffusion processes of primary defects are frozen. Quantitative analysis of the size of the colloids using small-angle *X*-ray scattering shows that the radius of the cylindrical aggregate zone is only slightly influenced by the irradiation temperature. Possible mechanisms for ion-induced colloid formation are discussed taking into account the high-excitation-energy density in the track core.