Chemical etching of ion tracks in LiF crystals

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In LiF, the formation of defects upon electronic excitations was studied using various heavy ions with energies up to 11.4 MeV/u. The induced damage was revealed by the technique of selective chemical etching. Track etching was successful only in those cases where the linear energy transfer of the ions had surpassed a critical threshold of about 1 keV/Å. Annealing tests after ion irradiation show that track etching is possible up to a temperature of 450 °C, i.e., the thermal stability of the etchable damage in ion tracks is much higher than simple defects such as color centers. It is concluded that the etchability of tracks in LiF is strongly related to the creation of defect aggregates.