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Thermal transport in aluminum oxide irradiated with swift heavy ions

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Thermal transport in α-Al2O3 irradiated with 167 MeV Xe ions is investigated within direct method based on the Fourier law implemented into classical molecular dynamics. Formation of defective regions as a result of ion passages is described using the original multiscale approach developed in previous works. Thermal conductivity degradation of single-crystalline alumina with ion fluence shows reasonable agreement with the experimental thermoreflectance data. The imposed method demonstrated good applicability in the considered case and allowed to distinguish effects of discontinuous crystalline tracks on thermal conductivity of the alumina target.

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