

## **Knock-on damage and atom motion**

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### **ABSTRACT**

Knock-on displacement arising from the high-angle elastic scattering of fast electrons can take several forms. Displacement of atoms within the bulk of a specimen requires some tens of eV and results in displacement to interstitial positions in the lattice and to vacancy loops if the specimen temperature is high. Displacement at the surface can take the form of electron-beam sputtering, with resulting thinning of the specimen. With even lower energy exchange, it results in displacement of adaptors along a surface - a random process that competes with thermal diffusion but dominates if the adsorption energy exceeds about 0.5 eV for a room temperature sample (0.2 eV for a specimen at 100 K). These processes can be avoided by reducing the incident-beam energy below some threshold value.