

## **Ionization damage in the TEM**

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### **ABSTRACT**

Ionization damage (radiolysis) arises from inelastic scattering of fast electrons and is a much more efficient process than knock-on displacement in most insulating materials, including organics. There is no threshold incident energy but the efficiency of the process can be reduced, typically by a factor of 3 to 10, if the specimen is cooled from room temperature to 100 K. Another way of reducing ionization damage, for reasons that are largely unknown, is to coating the specimen with a thin film on both surfaces. For organic specimens, radiolysis degrades the spatial resolution of imaging or analysis to a value that depends on the radiation sensitivity and the specimen thickness, but is typically several nanometers.