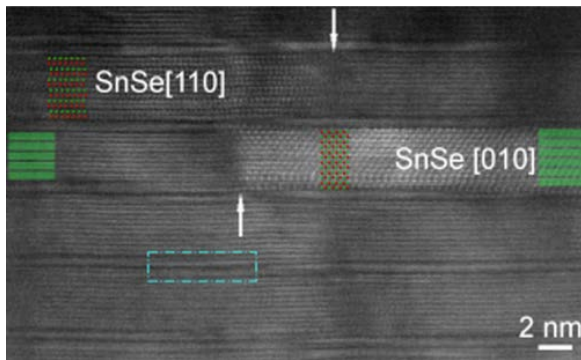


Superconducting Tin Selenide/Niobium Diselenide Ferecrystals

C. Grosse, M.B. Alemayehu, A. Mogilatenko, O. Chiatti, D. C. Johnson and S.F. Fischer
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Short Abstract

X-ray diffraction, electron diffraction and scanning transmission electron microscopy images prove the structurally independent 2D layers of precisely m tin selenide bilayers and a single niobium diselenide trilayer in heterostructure thin films with a rotational disorder between them. We found that superconducting critical temperatures decrease systematically as m , the number of tin selenide layers, increases. However, all are lower than that known for isolated single niobium diselenide layers, indicating a decoupling of these layers. A possible mechanism is a decrease in the density of states due to charge donation from the tin selenide layer.



Above. High-resolution HAADF-STEM of a ferecrystal $[(\text{SnSe})_{1.16}]_m(\text{NbSe}_2)_1$ with $m = 6$. Dashed boxes indicate stacking defects. Arrows indicate grain boundaries.