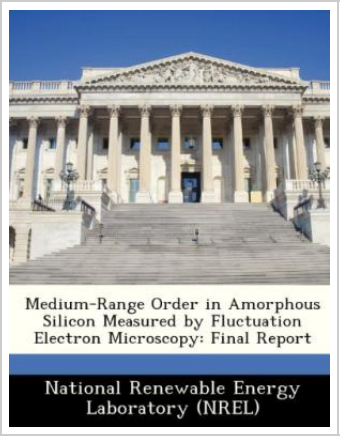

Medium-Range Order in Amorphous Silicon Measured by Fluctuation Electron Microscopy: Final Report (Paperback)

By -

Bibliogov, United States, 2012. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****. Despite occasional experimental hints, medium-range structural order in covalently bonded amorphous semiconductors had largely escaped detection until the advent of fluctuation electron microscopy (FEM) in 1996. Using FEM, we find that every sample of amorphous silicon and germanium we have investigated, regardless of deposition method or hydrogen content, is rich in medium-range order. The paracrystalline structural model, which consists of small, topologically ordered grains in an amorphous matrix, is consistent with the FEM data; but due to strain effects, materials with a paracrystalline structure appear to be amorphous in diffraction measurements. We present measurements on hydrogenated amorphous silicon deposited by different methods, some of which are reported to have greater stability against the Staebler-Wronski effect. FEM reveals that the matrix material of these samples is relatively similar, but the order changes in different ways upon both light soaking and thermal annealing. Some materials are inhomogeneous, with either nanocrystalline inclusions or large area-to-area variation in the medium-range order. We cite recent calculations that electronic states in the conduction band tail are preferentially located around the boundaries of the nm-scale paracrystalline regions that we...

Reviews

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