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SIMULATION OF ANTIMONY THIN FILM GROWTH

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Abstract

The well-known spherulitic structure of vacuum deposited antimony films suggests a simulation with a pair of compasses. The main reason for this simulation is that no one has yet explained why the distribution of antimony clusters after the amorphous — crystalline transition is, at least in parts, organized in a regular hierarchy. Another reason, less important, for the simulation concerning the regularity is that one did not know how to explain the crystallization process.

With this purely empiric and strongly idealized method it was possible to find out a great deal of correspondence between micrographs, electron micrographs and simulated patterns both of the surface and cross-sectional structure.

The external boundaries of the spherulites are well defined by different crystallization rates and by retardation at the beginning of crystallization due to the statistical character of the coalescence.

Different assumptions about the mechanism of crystallization led to the simulation of the cross-sectional structure which is responsible for the internal boundaries of the spherulites. These internal structures are very rich in forms but always characteristic of antimony thin films.

The interaction of various models will be demonstrated by the comparison of original and simulated patterns.