



VIRTUAL SEMINAR

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Atomic-scale aspects of crystal twinning

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Admiring the perfection of crystal shapes we often encounter unusual, twinned or twisted crystals, that defy simple crystallographic principles. In an ideal situation, when the surrounding conditions do not change and there is an endless supply of the constituent atoms, the same structure would be replicated with perfection to infinity. However in a real world, conditions change and the supplies are erratic. In its tendency to growth, the crystal will do anything to compensate such fluctuations. When the alien atoms, that are challenging the structure, are similar at least by their size or charge, the crystal will incorporate them in form of point defects on its regular or interstitial sites as long as simple compensating mechanism is at hand. In contrast, the atoms that are much too different, will have no interaction with the structure, and nothing dramatic happens. And there are some atoms that are able to deceive the structure to accept them as their own. Once they are built in, they re-define the structure and start to produce their own motif along with the hosting structure, bringing an endless possibilities of new structural arrangements. Not so long ago the crystallographers believed that twinned crystals, with defined symmetry elements, are a consequence of accidental attachment of two or more individuals. In this presentation we will see examples that growth twins in minerals are a highly balanced response of the system to incorporation of specific dopants during the crystal growth. In the hands of a scientist this knowledge provides a powerful tool to tailor new structures and design novel materials with fascinating properties.

Kindly invited.