OD Approach in Natural and Synthetic Inorganic Compounds: a useful Tool in Structure Solving and Structure Modeling

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The numerous researches carried on OD structures have clearly shown how that theory favours a deep insight into the various related phenomena of one-dimensional disorder, twinning (generally polysynthetic twinning), polytypism, and how it presents a comprehensive interpretation of the diverse anomalous features frequently displayed by diffraction patterns: diffraction enhancement of symmetry, diffuse spots, continuous streaking. However it is still far from constituting a 'normal' professional tool for mineralogists, inorganic chemists, material scientists. That is probably due to the erroneous assumption that the OD structures are relatively few in number and that their arrangements may be solved and described by 'normal' procedures. I shall try to clearly demonstrate its practical value and to show the various aspects in which OD approach may be extraordinarily and uniquely helpful, in particular:

a) The capability of OD approach to suggest the possible existence of new phases (new minerals in the case of natural phases) polytypically related to already known compounds, with exact indication of their crystallography and structure and its aid in overcoming serious problems during the refinement process.

b) The possibility to solve important problems where structural disorder had so far prevented the understanding of the 'real' structures. Interesting examples are presented by the C-S-H phases well known to the cement chemists, namely tobermorite, clinotobermorite, and their hydration and dehydration products.

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