



Wolfson Department of Chemical Engineering Seminar

Zoom seminar - <https://technion.zoom.us/j/97207403098>

Sunday - July 23rd 2023, at 13:30 (Israel time)

Title: Arginine induces spontaneous symmetry breaking of sodium chlorate crystals via clusters

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Abstract:

The spontaneous symmetry breaking of sodium chlorate (NaClO_3) with the presence of Arg molecules has been studied. The dominate crystals with the opposite handedness to amino acid molecules come from Arg clusters with the competitions among the homogenous nucleation and heterogeneous one. Part of nuclei generated by the latter process has the specific handedness, which was verified by the attrition experiments. And the NaClO_3 crystalline cell formation upon the Arg cluster was a second key to this symmetry breaking, and is stabilized by the electric interactions between the charges carries by clusters and entity ions in this crystalline cell based on our model. This model could explain the influence of polyelectrolyte on inorganic material nucleation, prevalent phenomena in Nature. Furthermore, we ruled out the contribution of interactions between amino acid molecules and ions in aqueous solutions to this symmetry breaking. And no evidence suggested Arg molecules modified NaClO_3 crystals growth and thereby biased their handedness distribution.