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Crowding and Ordering in the Assembly of Nanoparticles at Liquid Interfaces KONRAD SCHWENKE, Microstructure and Rheology, Institute for Building Materials, Department of Civil, Environmental and Geomatic Engineering, ETH Zurich, LUCIO ISA, Laboratory for Surface Science and Technology, Department of Materials, ETH Zurich, EMANUELA DEL GADO, Microstructure and Rheology, Institute for Building Materials, Department of Civil, Environmental and Geomatic Engineering, ETH Zurich — Experiments with self-assembly of nanoparticles at liquid interfaces suggest that cooperative and slow dynamical processes due to particle crowding at the interface govern the adsorption and properties of the final assembly [1]. We report a numerical approach to study non-equilibrium adsorption, which elucidates these experimental observations. The analysis of particle rearrangements shows that local ordering processes are directly related to adsorption events at high interface coverage. Interestingly, this feature and the mechanism coupling local ordering to adsorption do not seem to change qualitatively upon increasing particles size polydispersity, although the latter changes the interface microstructure and its final properties. Our results indicate how adsorption kinetics can be used for the fabrication of two-dimensional nano-composites with controlled microstructure.

[1] L. Isa, E. Amstad, K. Schwenke, E. Del Gado, P. Ilg, M. Kroger and E. Reimhult, Soft Matter, 2011, 7, 7663-7675.
[2] K. Schwenke, L. Isa and E. Del Gado, Assembly of nanoparticles at liquid interfaces: Crowding and ordering, submitted

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