Abstract Submitted
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Modeling the Self-assembly of Nanorod Superlattices ALEXEY TITOV, PETR KRAL, University of Illinois at Chicago — Colloidal semiconductor CdSe/CdS nanorods (NR) of diameters of 3-10 nm and lengths of 4-40 nm typically self-assemble into nematic and smectic phases, which are parallel to the substrate, or simple hexagonal (SH) superlattices, which are perpendicular to the substrate [1-2]. We model the formation of these structures by semi-classical means, starting from the forces between the nanorods, their coupling to the substrate and to the external electric fields. We determine the conditions under which superlattices with different number of particles, number of monolayers, aspect ratios of nanorods, etc. can be observed [3], and show that the obtained results agree well with the available experimental data. Our previous results of modeling superlattices of self-assembled monodisperse nanoparticles are also presented.

[1] L. S. Li and A. P. Alivisatos, Adv. Mater. 15, 408 (2003).
[2] D. V. Talapin et al., J. Am. Chem. Soc. 126, 12984 (2004).
[3] A. V. Titov and P. Kral, Nano Lett. 8, 3605 (2008).

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