

Large-area nanoparticle films by continuous automated Langmuir-Blodgett assembly and deposition

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We describe a general method to fabricate nanoparticle film by combining Langmuir-Blodgett deposition and continuous Landau-Levich thin film coating². Our approach is a scaled-up process for preparing nanoparticle films compared to regular batch method. In a continuously flowing trough, silica nanoparticles are injected onto a floating water surface and the lateral pressure of the circulating water helps the particles assemble into high density film. At the edge of the trough, a rolling system handles with dispensing spare substrate, transferring assembled nanoparticles film onto the substrate and collecting the samples with nanoparticles film afterwards. An appropriate combination of particle mass flow rate and the web speed is a crucial factor in this approach so as to control the organization of particles in the film. The mechanism of this process was investigated both experimentally and theoretically.

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²X. Li and J. F. Gilchrist, "Large-area Nanoparticle Films by Continuous Automated Langmuir-Blodgett Assembly and Deposition", *Langmuir*, 32 (5), 1220-1226, 2016