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Assembly of anisotropic particles in AC electric field

John P. Singh¹, Anne M. Grillet², Eric M. Furst¹

¹Department of Chemical Engineering, University of Delaware, Newark, DE 19716

²Sandia National Laboratories, New Mexico, Albuquerque, NM 87185

Abstract: The goal: Develop novel nanostructured materials using *directed* self-assembly

This work will employ AC electric field and optical trapping to direct the assembly of colloidal particles. It has been shown [1,2] that the spherical particles can form defect free crystals under the influence of AC electric fields. By employing anisotropic materials similar defect free crystalline structures can be obtained which can potentially be used in applications as diverse as solar cells and photonic materials.

We obtain ellipsoidal polystyrene particles by stretching the spheres at temperature greater than the T_g . Under the AC electric field these particles align with the field direction. As the field strength is increased, the ellipsoids interact with each other to form chains and then assemble to form either smectic 2D crystals or

'Banana bunches'. The continuing work is to explore, understand and control the conditions under which various assemblies are obtained.

[1] S. O. Lumsdon, J. P. Williams, E. W. Kaler, and O. D. Velev, J. Appl. Phys. 82, 949 (2003).

[2] S. O. Lumsdon, E. W. Kaler, and O. D. Velev, Langmuir 20 (2004).



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