

Mimicking cellular micro-environments with synthetic designer materials

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Our improved understanding of molecular biology, microfabrication, and materials chemistry has stimulated crossfertilization of two fields that had limited overlap even a few decades ago: biotechnology and materials engineering. In my presentation, I will discuss current advances in the design of multifunctional biomaterials and biointerfaces including three distinct examples under research in the Lahann group: (i) Chemically and biologically active coatings with one or multiple advanced functions can be synthesized by chemical vapor deposition (CVD) polymerization [1,2] as well as CVD co-polymerization [3]. (ii) Multicompartmental particles that exhibit a wide range of sizes, shapes and compartments can be prepared using electrohydrodynamic co-jetting [4,5]. (iii) Patterned microfibers can be synthesized via electrospinning that have to potential to provide spatially controlled guidance of cells in three dimensions [6].

[1] J. Lahann et al., *Science* **2003**, 299, 371-374; [2]; [1] H. Nandivada et al., *Angew. Chem.* **2006**, 45, 20, 3360-3363 [2] H.Y. Chen et al., *PNAS*, **2007**, 104, 1173-11178; [3] Y. Elkasabi et al., *Advanced Materials* **2006**, 18, 1521-1526. [4]K.-H. Roh et al., *Nature Materials* **2005**, 4, 759-763. [5] S. Bhaskar et al. *Angew. Chem.* **2009** (in press). [6] S. Bhaskar & J. Lahann *JACS* **2009** (in press).