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Unexpectedly wide distributions in the stochastic synthesis of functionalized nanoparticles. JACK WADDELL, DOUGLAS MULLEN, BRADFORD ORR, MARK BANASZAK HOLL, LEONARD SANDER, University of Michigan — Functionalized nanoparticles are promising devices with a variety of applications, such as the targeted delivery of chemotherapy drugs to cancer cells. Their properties depend on the specifics of the distribution of functional groups on the nanoparticle. Stochastic ligand conjugation is an efficient strategy for synthesizing large quantities of functionalized nanoparticles. We developed a kinetic model for the study of ligand distribution on a generation 5 poly(amidoamine) dendrimer, as measured by HPLC and SPR. We found a cooperative effect in single species ligation, leading to a broader-than-Poisson distribution of ligands on nanoparticles, and suggesting a high spatial correlation of functional groups.

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