# Photo-PISA: a powerful process combining efficiency, rapidity, and sustainability for the formulation of polysaccharides-based nano-objects

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**Résumé**

Polysaccharides-based nano-objects are promising candidates for biomedical technologies due to their biocompatibility, biodegradability, low immunogenicity, and specific bioactivity. Studies focused on the self-assembly of polysaccharide-based amphiphilic copolymers described mostly core–shell nanoparticles, while advanced morphologies, including worm-like micelles and vesicles, are rarely reported.1 Traditionally, these nano-objects are prepared through solvent-switch methods, that are multistep processes involving copolymer synthesis, purification and its subsequent self-assembly in water. However, the absence of a good common organic solvent (required by these methods) for polysaccharides and their associated hydrophobic synthetic polymers may explain the formation of kinetically frozen nano-objects. Here, we demonstrate the efficiency of the emerging one-pot methodology called "Photo-Polymerization Induced Self-Assembly" (Photo-PISA)2 to produce rapidly polysaccharides-based nano-objects of large sets of morphology, directly in water without using any organic solvents. As proof of concept, dextran and chitosan in association to various acrylate-based polymers were used as model systems to demonstrate the versatility of this methodology, and to prepare functional nanocarriers.3-7

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