# Curved single crystals from solution at room temperature

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Additive manufacturing has enabled low cost, large area, and solution-based processing. Moreover, it is also possible to assemble full-scale working devices with quantum dots (QDs) as the active layer[1]. Small fundamental building blocks (<100 nm) in the form of nanocrystals offer the unique flexibility to assemble crystals in complex shapes realizing novel functional properties via bottom-up assembly. In this work, we demonstrate the assembly of ~75 nm Ag cubes capped with polyvinylpyrrolidone (PVP) into curves of varying radii of curvature. We use polydimethylsiloxane (PDMS) as the flexible template to directly print and pattern the cubes at the same time on the substrate from a colloidal solution. Subsequently, we will overgrow the cubes epitaxially to convert them into single crystals as has been demonstrated earlier by our group[2]. Making curved single crystals is of interest to study ring resonator lasers or interaction of light with the crystal in terms of diffraction or redirection. Nanomanipulation to bend nanowires[3,4] or QDs assembled into lasers[5] has already been demonstrated, however, hardly any report exists showing the formation of curved single crystals by assembly and welding. The technique proposed enables room temperature fabrication of patterned single crystals of metals which makes it compatible with low heat resistant flexible polymeric substrates and roll to roll processing to enable next-generation optoelectronic devices.

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