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# Self-Assembly of Plasmonic Bipyramids into Supercrystals

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Organizing nanoparticles (NPs) into periodic structures is a central goal in materials science. Despite progress in the last decades, it is still challenging to produce macroscopic assemblies reliably. In this framework, I will focus on gold bipyramids featuring square and pentagonal cross-sections and sharp tips and their self-assembly directed by facet-facet alignment. The analysis of the organization of gold octahedra into supercrystals within microfluidic channels using a combination of X-ray scattering techniques and FIB-SEM tomography will be shown. In this case, the results reveal the formation of a single-domain supercrystal with a monoclinic C2/m symmetry and long-range order extending over the dimensions of the microfluidic channel, covering at least 1.7x0.3 $mm^2$. The orientation of the crystal remained unchanged during its formation, suggesting a growth mechanism directed by the channel interface. Together, these results show the potential application of pervaporation strategy to providing spatially determined control over NP crystallization, which can be used for the rational fabrication of nanomaterial architectures.

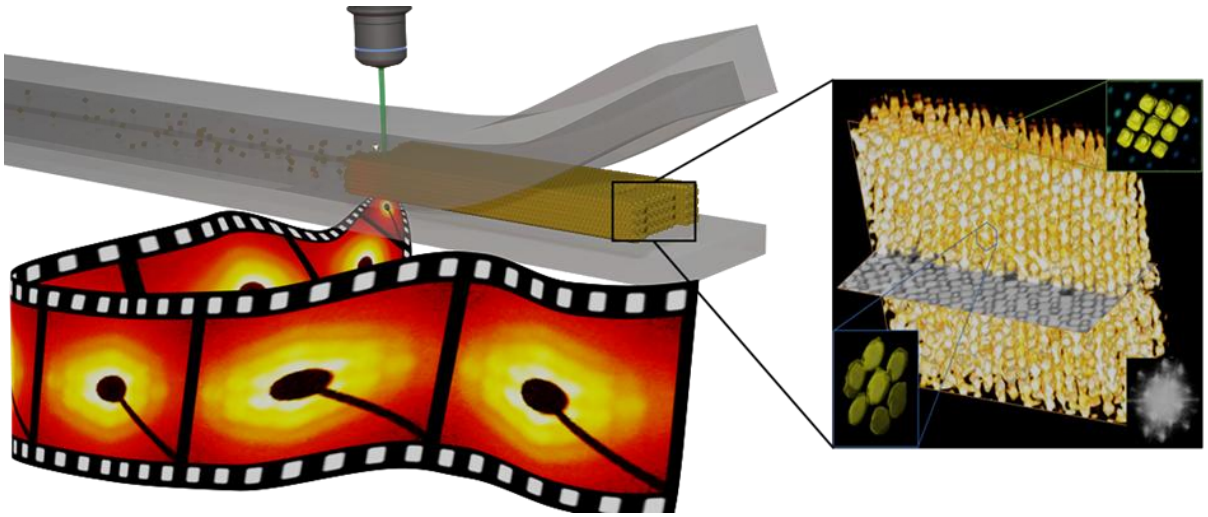

**Figure 1 :** A pervaporation-induced self-assembly strategy is used to obtain supercrystals of gold octahedra in a microfluidic channel. Supercrystal analysis by SAXS and FIB-SEM tomography indicated the formation of extended superlattices with a monoclinic C/2m crystalline symmetry. Image credit @ Daniel García-Lojo