



CYCLE DE CONFÉRENCES DE CHIMIE

*Avec le concours de : Université Clermont Auvergne
INP Clermont Auvergne*

Jeudi 4 décembre à 16 h

Amphi Rémi (site des Cézeaux)

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Engineering light: precursors and surface chemistry in Quantum Dots design

This talk will address recent advances in the surface and precursor chemistry of III-V and II-VI semiconductor nanocrystals, focusing on InP quantum dots (QDs) and CdSe nanoplatelets (NPLs). For InP QDs, surface passivation using anhydrous *n*-alkylammonium fluorides effectively enhances photoluminescence quantum yield (PLQY) and narrows emission linewidths through controlled etching and formation of stable metal fluoride terminated surfaces. In addition, we discovered a novel surface binding motif that provides new insight into the chemical structure and stabilization of InP surfaces, further expanding the scope of surface passivation strategies.

In the second part, we examine the chemistry underlying CdSe NPLs formation, emphasizing the impact of cadmium carboxylate precursor structure on NPL quality. Comparative studies of cadmium oleates, supported by TGA, FT-IR, and SAXS, reveal how precursor crystallinity and dissolution kinetics determine NPL thickness and uniformity. Complementary UV-Vis and TEM analyses confirm the structural-optical property correlations. Finally, we demonstrate that surface ligand design – tuning chain length, binding strength, and steric effects – enables controlled NPL bending and planarization, providing a versatile handle for tailoring their morphology and optoelectronic behavior.

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