

## Fullerene Compounds for Enhanced Solar Cell Efficiencies, Electrocatalytic Applications and to Stabilize Unusual Actinide Clusters Inside

Nat. Commun.2018, 9, 2753

JACS 2018, 140, 3907

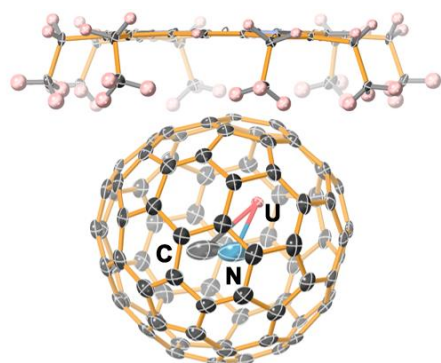
JACS 2019,141, 20249

**Luis Echegoyen**Av. Paisos Catalans, 16  
43007 Tarragona, Spain

lechegoyen@iciq.es

Because of their unique structures, variable isomeric compositions and tunable electronic properties, fullerenes have found multiple uses and applications in different fields: as electron acceptors and transporters, as structural building blocks, and as molecular containers to stabilize unique clusters inside, among many others.

In this presentation I will highlight the work that we have recently done with: 1) fullerene derivatives that act as electron extracting compounds from perovskite layers in solar cells<sup>[1]</sup>, 2) pristine fullerene nanosheet and nanotube crystals that exhibit electrocatalytic Hydrogen Evolution Reaction (HER)<sup>[2]</sup>, 3) fullertubes (C90 C96 and C100) for electrocatalytic Oxygen Reduction Reaction (ORR)<sup>[3]</sup>, and 4) functionalized empty and endohedral fullerenes for HER.<sup>[4]</sup> In addition, I will describe the unique endohedral structures formed by incorporating actinide elements and unique actinide clusters inside fullerene cages, which serve as stabilizing agents for these species, which cannot be prepared outside of the carbon structures.<sup>5</sup>



## References

[1] ACS Appl. Mater. Interfaces, 2019, 11, 34408-34415.

[2] Sustainable Energy Fuels, 2020, 4, 2900–2906.

[3] Angew. Chem. Int. Ed. 2022, 10.1002/anie.202116727.

[4] Nanoscale, 2022, 14, 3858

[5] JACS, 2023, 145, 25440

JACS 2023, 145, 6710

JACS 2023, 145, 5645

Nat. Commun,2022, 13, 7192