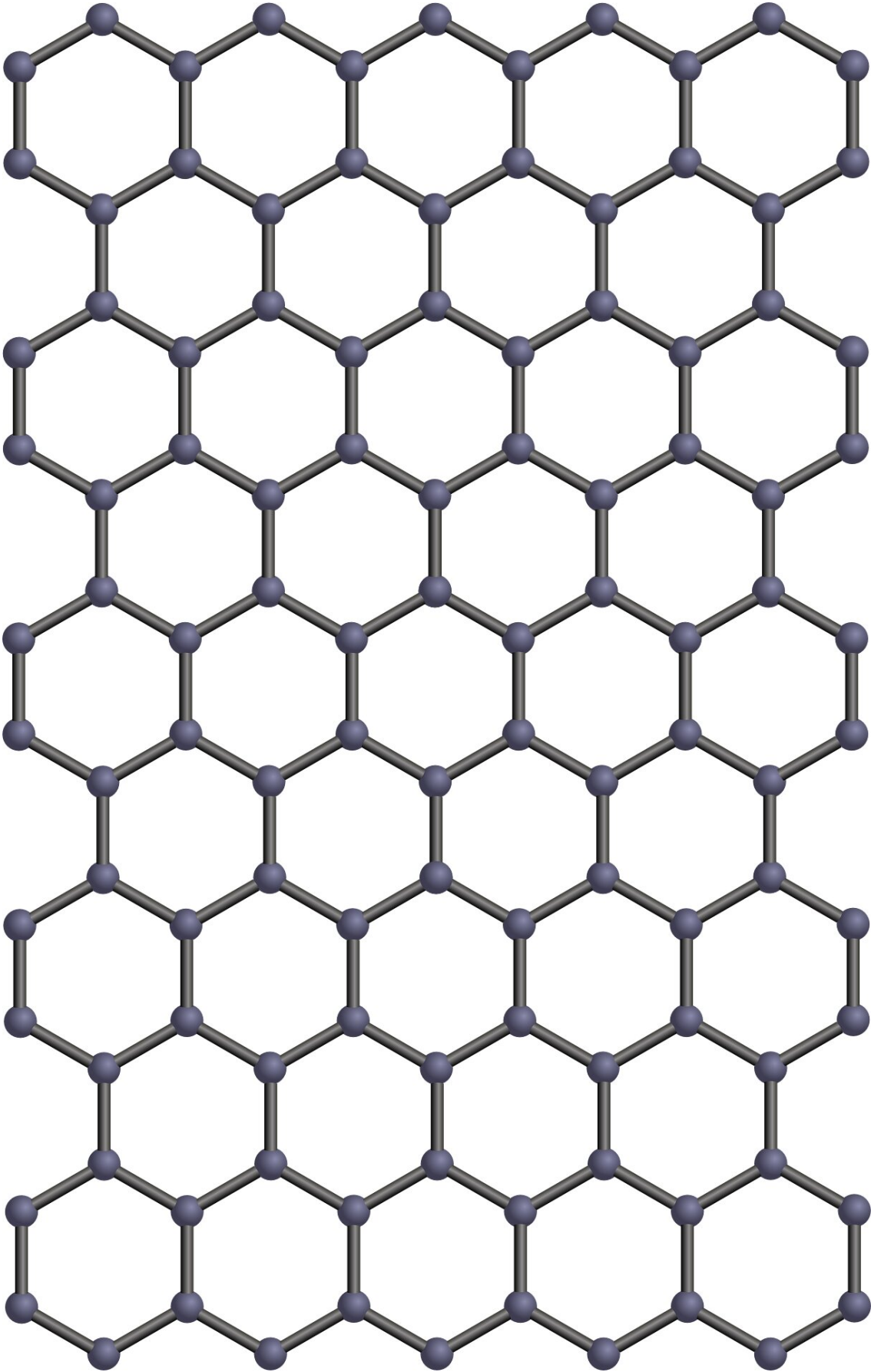


Researchers design a strategy to make graphene luminescent

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Lighter than aluminum, harder than a diamond, more elastic than rubber and tougher than steel. These are only a few of the characteristics of graphene, a super material that acts as an excellent heat and electrical conductor. Due to its features, it is considered a key player in future technological advances in the fields of research, electronics, IT and medicine.

The FQM-346 Organic Chemistry research group at the University of Cordoba came up with a technique to make the material luminescent, which now ushers in a new range of applications. Professor Francisco José Romero Salguero, one of the authors of the research, explains that luminescence is a characteristic of some substances which allows them to emit light at a different wavelength than the one they absorbed it at. In other words, luminescent [materials](#) can emit [visible light](#) from energy, a property that makes them useful as photocatalysts and fluorescent tags that can be displayed in macromolecules and biological materials. The research was published in *Chemistry – A European Journal*.

Though previous attempts have been made to endow this super-material with light properties, all of those were unsuccessful. What really makes [graphene](#) special is its hexagonal structure based on highly cohesive carbon atoms by means of a kind of electronic cloud in the shape of a sandwich. If the connection between the atoms in this cloud is interrupted, some of the properties are lost, explains researcher Francisco Romero.

The group overcame this obstacle. They were able to incorporate

luminescence into graphene without affecting its other qualities, thus safeguarding the functionality of its complex structure. In order to do so, europium was integrated into graphene. Europium is a metal that perfectly coordinates with the modified molecules of graphene and confers luminous properties.

The results offer immediate applications, since this luminescent graphene could be used in biological material and for analyzing tissue cells. However, the research goes even further. The use of europium "is just a concept test," explains University of Cordoba Professor César Jiménez-Sanchidrián.

Henceforth, this study opens the door to the use of a variety of chemical elements that could be combined with graphene to confer new characteristics. For instance, if certain kinds of metals are integrated, a magnetic graphene could be generated. Ultimately, it is a line of research that this group will continue to work on with the aim of adding new properties to graphene.

More information: Juan Amaro-Gahete et al. Luminescent Graphene-Based Materials via Europium Complexation on Dipyriddyridazine-Functionalized Graphene Sheets, *Chemistry – A European Journal* (2019). [DOI: 10.1002/chem.201900512](https://doi.org/10.1002/chem.201900512)

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