亮点报道：等离激元纳腔增强二维原子晶体的光与物质相互作用

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二维原子晶体和等离激元纳腔在接近原子尺度的范围相遇，实现了“强强联合”，在量子光源、高灵敏的光谱探测器件及光能转换方面有重要的应用前景。

香港中文大学王建方教授研究团队重点阐述了一种新型的集成结构——二维原子晶体与等离激元纳腔集成的可控制备方法、光物质相互作用的新现象，以及在光学和传感方面的重要应用前景。探讨了等离激元纳腔的光场局域原理以及构建等离激元纳腔的可靠方法。分析了运用等离激元纳腔中极强的局域电磁场增强作用，调控光与二维原子晶体中激子和声子相互作用的有趣现象。二维原子晶体与等离激元纳腔的集成结构为呈现二维原子晶体中光物质相互作用的微观过程提供了一个很好的平台，有望用于构建量子光源、高灵敏光谱探测器件及光能转换器件。

二维原子晶体与等离激元纳腔在接近原子尺度的有趣相遇为呈现光物质相互作用的微观过程提供了一个很好的平台。在未来的研究中，应该进一步探索集成结构的可靠构建及创新设计，利用“强大”的等离激元工具，更深入地研究二维原子晶体中新奇的光学效应 (例如能谷特性、莫尔超晶格) 及更多的可能性。

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Highlights: Control of light–matter interactions in two-dimensional materials with nanoparticle-on-mirror structures

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Integration of two-dimensional materials and plasmonic nanocavities is a win-win strategy, and holds significant application prospects in quantum light sources, high-sensitivity sensors, and solar energy conversion.

The research group of Prof. Jianfang Wang from The Chinese University of Hong Kong focuses on a new type of plasmonic nanocavities with integrated two-dimensional materials to study plasmon–exciton coupling. They explore the principles of electromagnetic field enhancement in plasmonic nanocavities and the reliable methods for constructing these nanostructures, analyzes the fascinating phenomena of controlling interactions between light and excitons and phonons in two-dimensional materials, and provides a detailed analysis of quantum phenomena and quantum plasmonic modes. The integrated structure of two-dimensional materials and plasmonic nanocavities provides an excellent platform for showcasing the microprocesses of light-matter interactions in two-dimensional materials, and the significant advancements in quantum light sources, high-sensitivity sensors, and solar energy conversion.

The fascinating encounter between two-dimensional materials and plasmonic nanocavities at the nanoscale provides an excellent platform for showcasing the microprocesses of light-matter interactions. In future research, the reliable construction and innovative design of integrated structures should be explored. The powerful plasmonic tools can be deeply delved into the novel optical effects in two-dimensional materials (such as valley properties, and moiré superlattices) to reveal more possibilities.

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