

NIKA, D., FOMIN, V. et al. Resonant Terahertz Light Absorption by Virtue of Tunable Hybrid Interface Phonon–Plasmon Modes in Semiconductor Nanoshells. In: Applied Sciences. 2019, Vol.9, Issue 7, 1442. ISSN 2076-3417.

Metallic nanoshells have proven to be particularly versatile, with applications in biomedical imaging and surface-enhanced Raman spectroscopy. Here, we theoretically demonstrate that hybrid phonon-plasmon modes in semiconductor nanoshells offer similar advantages in the terahertz regime. We show that, depending on the doping of the semiconductor shells, terahertz light absorption in these nanostructures can be resonantly enhanced due to the strong coupling between interface plasmons and phonons. A threefold to fourfold increase in the absorption peak intensity was achieved at specific values of electron concentration. Doping, as well as adapting the nanoshell radius, allowed for fine-tuning of the absorption peak frequencies.