Harnessing Surface Chemistry to Tailor Plasmonic Nanomaterials for biosensing and nanomedicine

Souhir Boujday

Sorbonne Université, CNRS, Laboratoire de Réactivité de Surface (LRS), 4 place Jussieu, F-75005 Paris, France

souhir.boujday@sorbonne-universite.fr

The surfaces of materials and nanomaterials are the place of their reactivity and govern their interactions with the surrounding environment. Whether flat surfaces or plasmonic nanostructures, these (nano)materials are at the core of diverse applications such as diagnosis, sensing, drug delivery, and antifouling.

The input of surface chemistry to the ultimate success of these (nano)materials is undeniable since it enables them to be shaped, stabilized, and functionalized with precision and rigor, and eventually combined, in a controlled manner, with biological molecules. Using examples developed in our group, NanoBioSurf at Sorbonne University, methods for functionalizing and decorating these (nano)materials will be discussed, focusing on tailoring them to the desired biological application, particularly biosensing and nanomedicine.
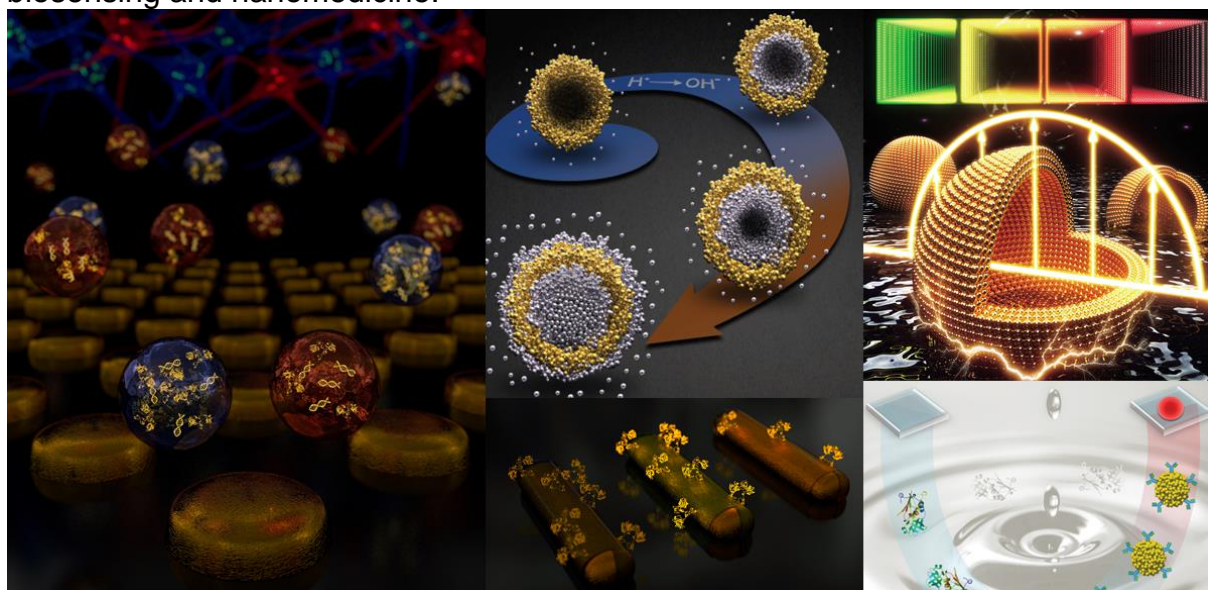
References

1. Hollow Gold Nanoshells for Sensitive 2D Plasmonic Sensors. Sun, D et al.; ACS Appl. Nano Mater., **2024** https://doi.org/10.1021/acsanm.3c05872

2. Silica-coated gold nanorods biofunctionalization for localized surface plasmon resonance (LSPR) biosensing. Pellas, V et al., Talanta; **2023**, *255, 124245* https://doi.org/10.1016/j.talanta.2022.124245

3. Biosensing Extracellular Vesicle Subpopulations in Neurodegenerative Disease Conditions. Mazouzi, Y et al. ; ACS Sensors; **2022**, 7, 1657-1665. https://pubs.acs.org/doi/pdf/10.1021/acssensors.1c02658

4. Core-shell Gold Silver Nanoparticles for LSPR-Based Naked Eye Toxin Biosensing. Loiseau, A. et al.; *ACS Appl Mater & Interfaces* **2019**, 11, 50, 46462–46471. https://doi.org/10.1021/acsami.9b14980

5. Naked Eye Immunosensing of Food Biotoxins Using Gold Nanoparticle-Antibody Bioconjugates. Zhang, L. et al., *ACS Appl. Nano Mater.* **2019,** *2* (7), 4150. https://doi.org/10.1021/acsanm.9b00598