

Shining light on metal colloids in the trace detection of water pollutants

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Water is essential to all known life forms. The sustainable use of water resources is an unquestionable global challenge whose relevance had increased with the awareness for climate changes.[1] This is a rather complex issue requiring effective measures at very different levels but that necessarily need safe technologies to ensure water quality for all. Nanomaterials science shows great potential in this field, namely when associated to emerging point-of-care water monitoring and purification nanotechnologies.[2,3] In this lecture, the above topic is approached by presenting selected examples of our research in the chemistry of nanomaterials for water quality monitoring, in particular by discussing applications based on surface enhanced Raman scattering methods (SERS) using metal colloids.[4-6] The challenges posed in the implementation of these methods depend largely on our ability to synthesize and modify nanomaterials for target environmental applications. Thus, several chemical strategies are presented here that tackle current limitations found in this field, such as the long-term stability of homogeneous colloidal SERS substrates versus the fabrication of reproducible and low-cost solid substrates. A final discussion concerns the perspectives for real applications of SERS methods to monitor trace amounts of contaminants in complex aqueous matrices and the challenges ahead of us.

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