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| Sommario/riassunto | Fostered by the remarkable progress in the fabrication of nanoparticles and nanostructures, in the last years Surface-Enhanced Raman scattering (SERS) has reached an impressive diffusion in many fields of chemistry and analytical sciences. Several exciting results have been recently reported in SERS-based ultrasensitive detection and molecular imaging. However, more than forty years after its discovery, conventional SERS is still struggling to make its way as a reliable analytical method. The remarkable enhancement of the local electromagnetic field achieved by plasmonic nanostructures is indeed a double-edged sword, as in pushing the sensitivity to the ultimate level, it strongly limits accuracy and reproducibility of the Raman data. In this context, non-plasmonic or hybrid plasmon/dielectric systems are emerging as a promising alternative/complement to conventional SERS. Core/shell systems like T-rex or SHiNERS are only a few examples of these novel SERS-active platforms. In parallel, new theoretical models, based on quantum optomechanical approaches have been recently proposed and developed for describing and predicting plasmonic, non-plasmonic and hybrid (e.g. photo-induced enhanced Raman scattering, PIERS) SERS, also including opto-thermal effects. Moreover, the next-generation of SERS-active materials is facing new challenges in terms of detection strategies, integration with complementary methods and stimuli responsiveness. This Research Topic collects the most recent advances in SERS and related effects, from the viewpoint of |

theory/models, materials and detection strategies, providing an up-to-date forum for setting the basis for future research in this vibrant field.