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Gold Flakes based nanostructure as new SERS sensing platform

Plasmonics, the physics of coupled states between light and surface charge density oscillations, is a thriving research topic with a plethora of potential applications, like miniaturized optical antennas, plasmonic waveguides, meta-materials, or high-sensitivity sensing [1]. Plasmonic nanostructures are often made from noble metals such as gold, as it is stable under ambient conditions and shows surface plasmon resonances in the visible wavelength range [2]. In this project, we utilized the gold flakes as highly efficient plasmonic structures platform (Fig.1). Plasmonic structures were fabricated by direct focused ion beam (FIB) milling [3]. The thin gold single-crystalline layer with an atomically smooth surface and structures demonstrated outstanding optical Raman signal enhancing compared to polycrystal gold (Figure.1). The results demonstrated that gold flake platform shows precise, reproducible, reusable, generic plasmonic substrate which has huge significance for basic science, pharmacological the agricultural and economy industries.

References

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Figures

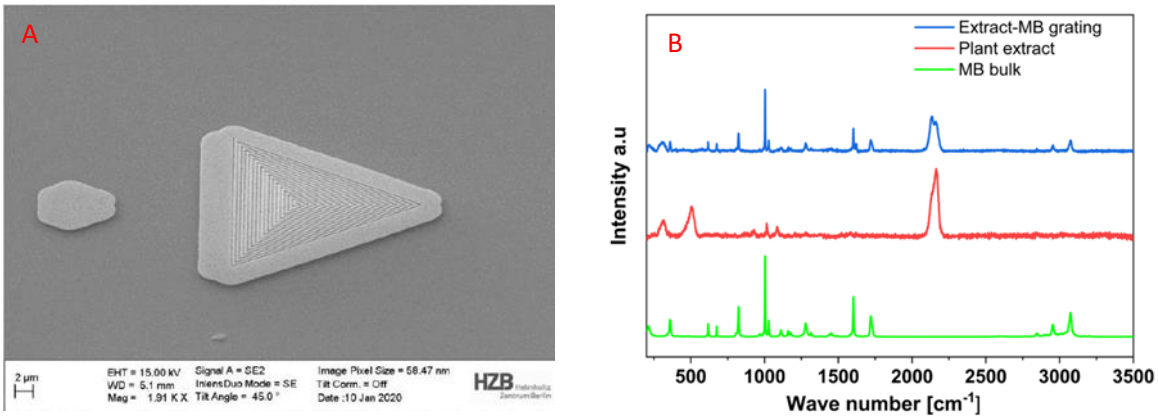

Figure 1: (A) Gold flake nanostructure milling, (B) Surface enhanced Raman signature obtained by gold nanostructures