Surface enhanced Raman spectroscopy (SERS) sensing in aqueous sample enabled by UV/ ozone treatment

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We present the development of a detection strategy based on surface-enhanced Raman spectroscopy (SERS) sensing in aqueous samples enabled by UV/ozone treatment.

**SERS Sensing in Water**

Pharmaceuticals have become integral parts of our daily life. However, this widespread availability poses a potential risk of leakage into our environment leading to possible disturbances in various eco systems. Even though low concentrations of single drugs are not necessarily harmful, cross-reactions with other drugs and accumulation can be dangerous if not carefully monitored.

**SERS Substrate - Gold Capped Nanopillars**

SERS is a powerful analysis technique capable of detecting molecular fingerprints of analytes with high sensitivity and fast response time. [2]

Complex matrices can lead to sensor fouling. Organic solvents are preferred, due to the hydrophobic nature of the nanopillar surface.

**Surface Treatment**

UV/ozone exposure is commonly utilized as surface treatment and cleaning procedure in a variety of microfabrication processes. It renders the surface of gold-capped nanopillars from hydrophobic to hydrophilic without any morphological alterations.

**Liquid Measurements**

UV/ozone treatment enabled the development of a novel liquid measurement technique for nanopillar SERS based sensing.

**UV/Ozone Treatment**

UV/ozone surface treatment resulted in a lowered background signal, more defined peak shape and homogenous wettability in aqueous samples in comparison to untreated and pre-cleaned samples. Optimal signals were obtained after 30 min of treatment and samples were stable for 3 hrs in an ambient environment.

**References**