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SERS devices designed for various industrial applications in food sciences, agriculture and environmental monitoring

Surface-enhanced Raman spectroscopy (SERS) has long fascinated researchers associated with the field of plasmonics, but in recent years, there are growing numbers of non-specialists who become intrigued by the possibility of applying SERS to their own fields such as food science, agriculture, environmental monitoring and medicines. Target molecules can range from more traditional organic compounds to polymers and inorganic substances. In our lab, we have been making SERS substrates based on metal film on nanosphere (mFON) and offering them free of charge for those interested in exploring the potential of SERS. After having received requests for detecting various target molecules, we have developed various SERS devices suited for particular applications. In this presentation, we will describe four types of such SERS devices. **Standard** SERS spot consists of an area, 3 mm in diameter, covered by silver nanoparticle [1]. A second type, referred to as **Lotus SERS**, consists of a smaller area, 1 mm in diameter, surrounded by a superhydrophobic area, suited for taking measurements of a highly diluted liquid sample of low volume [2]. A third type called **FlexiSERS** is designed to take direct measurements of molecules adsorbed on a solid surface. This is well suited for detection of residual pesticides on agricultural produces [3]. The fourth type is characterized by the use of aluminum base substrates shaped like combs, **AluSERS**. This is suitable for taking SERS measurements of multiple samples in parallel for high-throughput characterization. For all four types of SERS devices, we will describe specific applications with target molecules ranging from food additives, pesticides, microplastic, volatile sulfur compounds, halogen compounds, drugs in blood etc.

References

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Figure

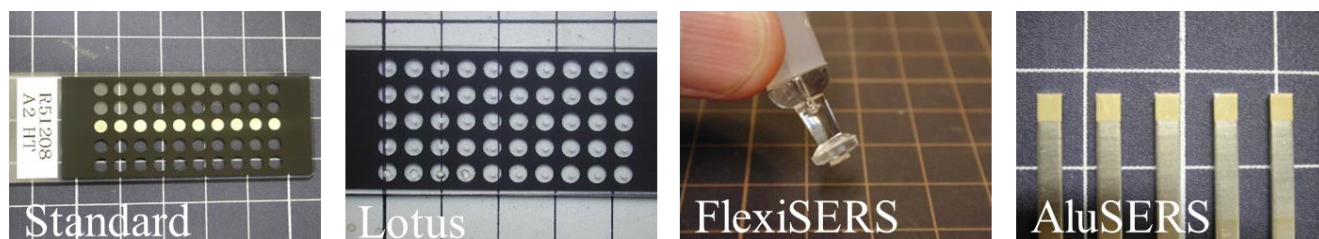


Figure 1: Four types of SERS devices optimized for various industrial applications