

Highly crystalline ZnO film decorated with gold nanospheres for PIERS chemical sensing,
Grégory Barbillon, Thomas Noblet and Christophe Humbert, **Phys. Chem. Chem. Phys.**, 2020,
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Abstract:

In this paper, we report on the study of a novel type of substrate based on a highly crystalline ZnO film photo-irradiated using UV for enhancing the Raman signal. This effect is called photo-induced enhanced Raman spectroscopy (PIERS). This PIERS substrate is composed of a photo-irradiated thin ZnO film on which gold nanoparticles are deposited and allows large photo-induced SERS enhancement to be obtained for the chemical detection of small molecules compared to normal SERS signals. This photo-induced SERS enhancement is due to increasing electron density of the gold nanoparticles and charge transfer mechanisms. Here, we achieve a high-quality PIERS substrate, the signal of which exhibits weaker fluctuations and a similar or greater gain (up to 7.52) than those reported in the current literature. Henceforth, these PIERS substrates can be of great potential for industrial applications.

Graphical TOC:

