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Characterization of Au/Rare Earth Oxide/Au Thin-films by all Optical Photoacoustic Spectroscopy[1] ZANNATUL YASMIN, NATHAN RAY, EDWARD KHACHATRYAN, Physics and Astronomy, University of Texas at San Antonio, SAHER MASWADI, RANDOLPH GLICKMAN, Ophthalmology, University of Texas Health Science Center-San Antonio, KELLY NASH, Physics and Astronomy, University of Texas at San Antonio — Photoacoustic spectroscopy (PAS) is a sensitive spectroscopy based on transit pressure waves generated from laser-induced thermal expansion in absorbing medium. Over the last decade the technique has shown promise for sensing, imaging and detection in biological applications especially when using nanoparticles. The nanoscale interaction of functionalized nanoparticles (fNPs) has attracted interest due to their potential applications in biosensors and biomedical diagnostics. In particular, gold nanoparticles have been used as contrast agents for signal enhancement and time-intensity curve measurements. Moreover, rare earth ion doped rare earth metal oxide (REMO) exhibits multi-wavelength absorbance and emission that overlap well with the surface plasmon resonance of fNPs. In this work, we are characterizing gold attached Er^{3+} doped Y_2O_3 coated by silanation as a thin film formed on a glass surface by use of an all optical PAS technique. We expect that, this PAS technique will provide unique information about the interaction of the fNPs and REMO and use as sensors in the biological systems without the artifacts limiting the use of current methods, such as fluorescent indicators.

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