Abstract Submitted
for the TSS21 Meeting of
The American Physical Society

Shifted Excitation Raman Difference Spectroscopy for spore detection ZEHUA HAN, BENJAMIN STRYCKER, BLAKE COMMER, KAI WANG, BRAIN SHAW, MARLAN SCULLY, ALEXEI SOKOLOV, Texas AM University — The presence of fluorescence emission leads to several problems for Raman detection in bio-samples. One is "fake" spectral structure which could be easily considered as spontaneous Raman peaks. One approach to get rid of fluorescence is Shifted Excitation Raman Difference Spectroscopy (SERDS), in which a tunable laser produces two spectra with slightly different excitation frequencies. The difference between the two generated spectra can suppress fluorescence contribution significantly. Here, we combine the SERDS strategy with genetic breeding of Aspergillus nidulans mutants and illustrate that the Raman signal originates from pigment molecules. Moreover, we observe fine-structure in fluorescence at room temperature, possibly resulting from the formation of molecular cages in the biopolymer matrix of the cell wall. We also utilize the technique to study the conidia of 8 different mold species. The results demonstrate that the pure Raman spectra correlate with the melanin biosynthesis pathway, such that species exhibiting a negative response to DHN chemical inhibitors have similar Raman spectra, which in turn differ from those of species exhibiting a positive response.

Zehua Han
Texas A
M University

Date submitted: 19 Mar 2021 Electronic form version 1.4