

## APPLICATION OF TWO DIMENSIONAL FLOURESCENCE SPECTROSCOPY TO TRANSITION METAL CLUSTERS.

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Determining the physical properties (bond lengths, angles, dipole moments, etc) of transition metal oxides and dioxides is relevant to catalysis, high temperature chemistry, materials science and astrophysics. Analysis of optical spectra is a convenient method for extraction of physical properties, but can be difficult because of the density of electronic states and in the case of the dioxides, presence of both the oxide and superoxide forms. Here we demonstrate the application of two dimensional fluorescence spectroscopy<sup>a</sup> for aiding in the assignment and analysis. Particular attention will be paid to the spectroscopy of first row transition metal monoxides and dioxides of Nickel, NiO and NiO<sub>2</sub>, and Manganese, MnO. Furthermore, the application of this technique to discovering the spectrum of other transition metal systems such as Metal-dicarbides will be outlined.

<sup>a</sup>N.J. Reilly, T.W. Schmidt, S.H. Kable, *J. Phys. Chem. A.*, 110(45), 12355-12359, 2006

