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Title:	Probing ultrafast dynamics in condensed phase by 2D IR spectroscopy and Impulsive Stimulated Raman Spectroscopy
Authors:	<a href="#">Mon, Akhil B</a>
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Abstract:	<p>The nanocrystal surface, which acts as an interface between the semiconductor lattice and the capping ligands, plays a significant role in the photophysical properties of semi-conductor nanocrystals for use in a wide range of applications. Replacing the long-chain organic ligands with short inorganic variants improves the conductivity and carrier mobility of nanocrystal-based devices. However, our understanding of the interactions between the inorganic ligands and the nanocrystals is obscure due to the lack of experiments to directly probe the inorganic ligands. Herein, I am also citing the work already done in the lab where they used two-dimensional infrared spectroscopy to show that the variations in the inorganic ligand dynamics within the heterogeneous nanocrystal ensemble can identify diversities in the inorganic ligand–nanocrystal interactions. The ligand dynamics timescale in SCN–capped CdSe nanocrystals identifies three distinct ligand populations and provides molecular insight into the nanocrystal surface. In the later part of the thesis, we worked on a Deep Eutectic Solvent(DES) to understand the interaction of co-solvents in DES systems. With the help of Impulsive Stimulated Raman Spectroscopy(ISRS) and theoretical calculations, we tried to explain this phenomenon, the outcome of which revealed a synergistic effect of co-solvent in the intermolecular interaction within DES components.</p>
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