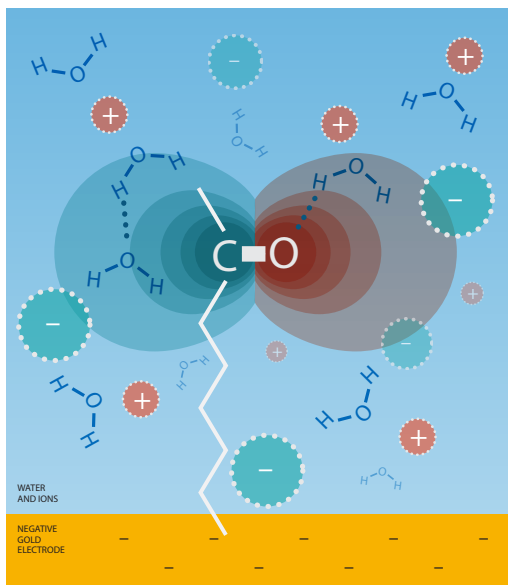
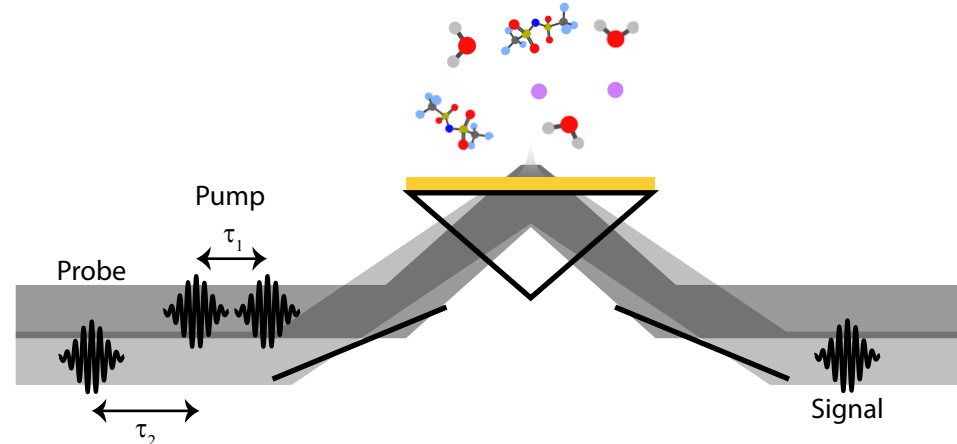


## Transient IR Spectroelectrochemistry at Interfaces

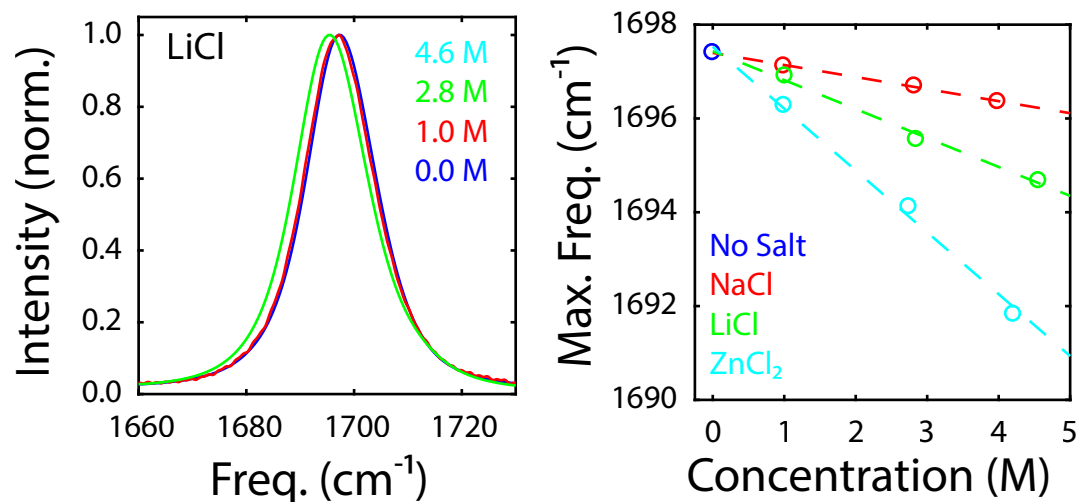


The structure and dynamics of electrolyte solutions near electrified interfaces have major ramifications for the function of electrochemical cells, batteries, and water treatment devices.



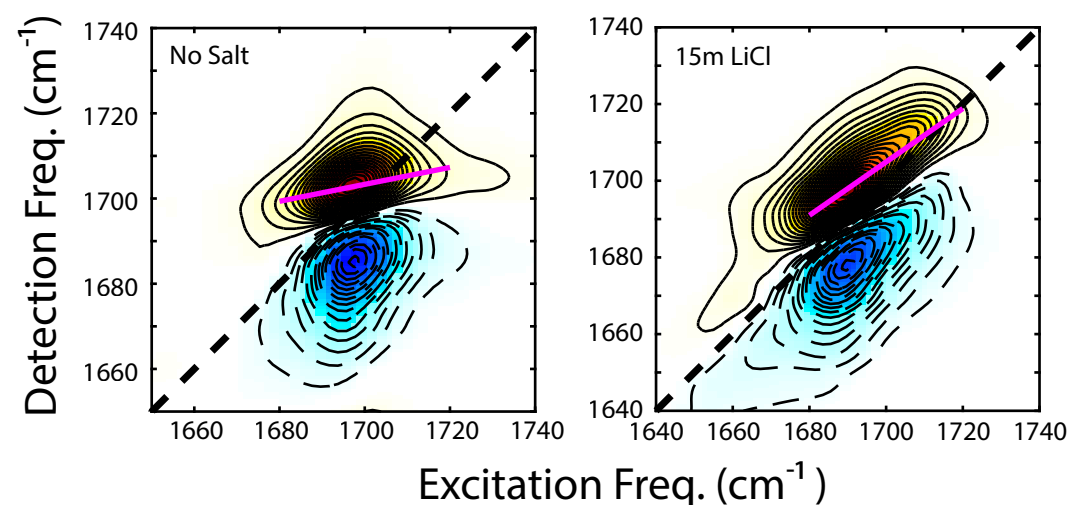
We are developing a transient ATR-IR experiment to study the interfacial electrolyte structures in systems relevant for catalysis, water remediation and next-generation aqueous Li-ion batteries.

### Acetone Carbonyl Stretch



We have used dilute acetone to probe local electrostatics in concentrated electrolyte solutions. The C=O stretch frequency shifts with concentration and cation charge density. C=O containing molecules tethered to the electrode will allow us to study the properties at the interface

### Acetone Carbonyl Stretch



In highly concentrated LiCl solution, the 2D IR spectrum reveals more heterogeneity in local environments and slower solvation dynamics.

Recent studies have found that some battery electrolytes have surprising properties at extremely high concentration. 2D IR spectra of LiTFSI/H<sub>2</sub>O allow us to study the formation of extended ion and water networks in these superconcentrated solutions, and help us understand the local solvation structures in these electrolytes.

