Spectroscopy of chiral molecules: from the gas phase to solution

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In our laboratory, we use experimental spectroscopic techniques and *ab initio* calculations to quantitatively characterize the phenomena of chirality and chiral recognition on the molecular level. I will present a series of high resolution rotational and vibrational spectroscopic studies of propylene oxide and its binary adducts with ethanol, glycidol, and itself. Using the experimentally established structures and stability ordering, complemented with the *ab initio* calculations, we examine the chiral discriminating forces at play in these molecular systems. In the second part of the talk, I will discuss our two-pronged approach to study the effects of solvent-solute hydrogen-bonding on chiroptical measurements using both high resolution spectroscopy and vibrational circular dichroism (VCD) spectroscopy. We observed that some vibrational bands of an achiral molecule, such as water, can show significant VCD strength through hydrogen-bonding to a chiral molecule. This effect, termed chirality transfer, will be discussed.