

The aim of the project is to understand how high pressure influences the properties of the intramolecular hydrogen bond. In the context of this project we define high pressure as one that is more than ten thousand times greater than that found on the Earth's surface. Such conditions can be obtained with the use of the diamond anvil cell – a small instrument in which the studied sample is located between the tips of two diamonds. Pressure is generated by reducing the gap between the tips of the diamonds.

The diamond anvil cell will be used to study molecules containing the intramolecular hydrogen bond. The hydrogen bond is a relatively weak, although very important chemical interaction - it is responsible for the lower density of ice compared to liquid water (and hence the fact that ice floats on water). It is also the hydrogen bond that holds together DNA in which the genetic information is located. Most often hydrogen bonds glue two different molecules, but in some cases this interaction can be confined to one molecule – that is what we call a intramolecular hydrogen bond.

Changes in the intramolecular hydrogen bond can have large consequences for the properties of molecule, among other what kind of light the molecule absorbs. In this project we want to study how with the use of high pressure we can modify the intramolecular hydrogen bond and consequently control the properties of the studied molecules.