

### Plenary Talk

PV IX Thu 8:30 HSZ 01

**Self-healing rubbers and glasses from supramolecular assembly** — ●LUDWIK LEIBLER — Matière Molle et Chimie, CNRS – ESPCI ParisTech (UMR 7167), 10 rue Vauquelin, 75005 Paris, France

Supramolecular chemistry can help to solve the dilemma of making easily processable materials with good polymer-like properties and thereby contribute to alleviate some important social issues of 21<sup>st</sup> century. It can also allow synthesis of materials with unique hitherto unimaginable properties. My lecture will try to answer the question of how small molecules can exhibit polymer-like properties thanks to direction interactions. I will also show how direction interactions say multiple parallel hydrogen bonds and dynamic correlation effects

can be harnessed to lead to self-healing supramolecular rubbers and glasses. Such materials when broken or cut can be simply mended and basically recover their initial mechanical properties by bringing together fractured surfaces to self-heal at room temperature. The process of breaking and healing can be repeated many times and healing does not require heating or using chemical reactions. Interestingly, the discovery of self-healing rubbers could shed new light on physics of association.

The discovery of self-healing rubbers opens challenging questions about unusual glassy-like dynamics, physics of fracture and adhesion but also interestingly it could shed new light on physics of simple liquids such as water or water/alcohol mixtures.