

# Solvay Colloquium



## Professor Ludwik Leibler ESPCI Paris, France

### *Vitrimers: principles and perspectives*

During cooling, amorphous silica, the archetype glass-former gradually increases its viscosity over a wide temperature range and it becomes so viscous that for all practical purposes it behaves like a hard solid, the glass. In striking contrast and without exception all organic glass-formers increase their viscosity and rigidify very abruptly when cooled. Moreover, silica is not soluble. We imagined, vitrimers, organic materials that undergo gradual glass transition and are not soluble just like silica. Vitrimers are molecular networks that through thermo-activated exchange reactions are able to change their topology without changing the total number of bonds. Solid at low temperatures and malleable when heated yet insoluble whatever the temperature, vitrimers constitute the third class of polymers along with thermoplastics and thermosets (elastomers). First vitrimers were made from epoxy resins. Today most plastics and rubbers can be transformed into vitrimers. Since vitrimers can be shaped, assembled, repaired and recycled while showing exquisite chemical and thermomechanical resistance they should rapidly find applications in electronics, automotive, air-plane, and coatings industries. And as for inorganic glass-formers, the question whether amorphous silica is a vitrimer opens intriguing perspectives.

**Tuesday 12 December 2017 at 4.00 P.M.**

**COFFEE AND TEA WILL BE SERVED AT 3.45 P.M. IN FRONT OF THE SOLVAY ROOM**

#### SOLVAY ROOM

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