The Chemist's Interactions

Seminars @ the Chemistry Department

ROOM G11 h 14.30

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Polymers that respond to oxidants

Macromolecules containing sulphur(II) species, namely thioethers (sulfides) and thioacetals, hold several peculiar properties regarding their interaction with potential oxidant species. The main characteristic of such materials is the capacity to react with oxidants (including biologically relevant inflammatory mediators), which turn sulphur to higher oxidation states: this can determine large changes in polarity and trigger reorganizations in self-assembly, as well as the delivery of encapsulated molecules. This gives a wide array of possible choices for the study of such a class of materials, ranging from the application of synthetic techniques for the fine control over primary structure or macromolecular architecture, to their use directly as therapeutic agents (due to the anti-inflammatory effects of ROS removal) or their oxidatively-stimulated release of pharmaceutically active agents. In the talk the current state of knowledge in terms of synthetic techniques and biomedical applications for both polysulfides and polythioacetals will be addressed, focusing on the differential sensitivity of these sulphur groups to oxidants: thioethers, for example, are substantially unresponsive to some oxidants such as superoxide, which on the contrary react readily with polysulfides. The combination of oxidation responsiveness with e.g. thermal sensitivity will be discussed and finally there will be a focus on the concept of sacrificial oxidation, where the action of scavenging biologically relevant oxidants (Reactive Oxygen Species, ROS), is used to increase the stability of cargos (proteins) against oxidative damage in a biological environment.

zoom

The event will be streamed on zoom.us for external participants!

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