Seminars at the Department of Chemistry and Industrial Chemistry

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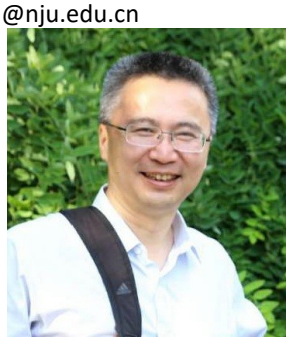

CV: Lecturer at Fudan University from 1995-2000. Professor at Nanjing University since 2004. Visiting professor at Hiroshima University from Jan. 2007 to Mar. 2007. Currently a board member of IUPAC Polymer Division, and associate editor of Sinica Polymerica Acta**.**

Education: Graduate in 1998 and got PhD in 1995 from Fudan University.

Academic Career: - 1998-1999: Postdoc under the supervision of Prof. Gert Strobl at Freiburg University, Germany. 2000-2001: Postdoc under the supervision of Prof. Bernhard Wunderlich at the University of Tennessee, USA. 2001-2004: Postdoc under the supervision of Prof. Daan Frenkel at FOM Institute for Atomic and Molecular Physics, Netherlands. 2004-: Full Professor at Nanjing University.

Current research interests:
Polymer crystallization and related physical chemistry, with the approaches of simulations and Flash DSC measurement.

Publications: More than 90 articles and letters, 14 reviews and book chapters, 5 authored books.

July 01, 2019
Aula Magna
15:00

The physics of polymer chain-folding

Abstract.
Chain-folding represents a motif configuration in lamellar polymer crystals as well as in protein beta-sheets. This seminar presents a survey on our current understanding about polymer chain-folding and unfolding in lamellar crystals. The origin of chain-folding was elaborated by the intramolecular crystal nucleation model, by means of free energy calculation of single-chain crystallization. Furthermore, the rate equation of polymer crystal growth was derived on the basis of reversible intramolecular secondary crystal nucleation at the lateral growth front of the lamellar crystals. Thus, many unique phenomena of polymer crystal growth can be explained, including the semi-crystalline texture, shish-kebab crystallites and the limited lamellar thickness. In addition, the folded-chain polymers perform unfolding upon crystal annealing and melting as well as strain-induced melting–recrystallization, with the microscopic mechanisms in line with polymer chain-folding. Polymer unfolding provides semi-crystalline polymers with unique thermal and mechanical properties, in particular, for synthetic fibers, plastic films and plastic bottles. Therefore, chain-folding serves as a key to unlock the secrets of crystallization and melting behaviors of polymer materials for controlling their properties. Last but not least, polymer chain-folding can be a prototype model for our understanding of fundamental problems on protein folding, misfolding and unfolding. Three corresponding examples on the fast path of protein folding, the kinetic suppression of amyloid growth, and the high toughness of spider silks, will be introduced.

References:

1. Hu, W.-B. The physics of polymer chain-folding. Physics Reports 747, 1-50(2018).

To find out how to reach the Department, go to http://www.chimica.unige.it. For further informations on this specific seminar or in order to ask for an appointment with the speaker after or before the seminar, contact **Prof. Dario Cavallo**,☎+39 010 3538721 e-mail: dario.cavallo@unige.it