PRESENTER INFORMATION

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BIOGRAPHICAL SKETCH

Dr. Duran graduated from Yıldız Technical University, Istanbul, Turkey with a bachelor of engineering degree at Chemical Engineering department in June 1997. Then she received her PhD degree at the University of Akron, Akron, Ohio, USA in Polymer Engineering department in 2004. Later, she joined the Max Planck Institute for Polymer Research (MPI-P), Mainz, Germany as a Marie Curie Intra-European Fellow. In December 2010, she moved to TOBB University of Economics and Technology (TOBB UET). Since April 2013 she is serving as Associate Professor at TOBB UET in Materials Science and Nanotechnology Engineering Department and Micro and Nano Technology Graduate Program and leading Micro and Nano Interface Engineering Research Group (MiNiERG).

TITLE: Crystalization in Nanopores: Crystal Growth & Polymorphism of Confined Polymers

ABSTRACT: Nanoporous aluminum oxide membranes (AAO) provide a two-dimensionally confined space in which self-organization processes such as crystallization, protein secondary structure formation, and phase separation can be fundamentally different from those obtained in thin films and in the bulk. Understanding the crystallization, thermodynamics and dynamics of polymers under confinement allow for their rational design as functional devices with tunable mechanical strength, processability, electronic and optical properties. Bulk crystallization of polymers proceeds usually via heterogeneous nucleation. Important studies of polymer crystallization confined to droplets and within the spherical nanodomains of block copolymers emphasized the interplay between heterogeneous and homogeneous nucleation. Some studies have even reported only homogeneous nucleation of polymers confined to AAO nanopores. This finding is surprising and leads to several questions about the type of nucleation under hard confinement typical for AAO: Is the crystallization process always homogeneous within the small AAO nanopores? Do surface effects always dominate? And even more, can hard confinement completely suppress polymer crystallization and if so what is the required size? Providing answers to these questions is of technological

relevance for the understanding of nanocomposites containing semi-crystalline polymers. We will try to explore these issues both comparing the recent studies and research activities of our group.