



**BILKENT UNIVERSITY**

**unam** - INSTITUTE of MATERIALS SCIENCE & NANOTECHNOLOGY

***FACULTY OF SCIENCE***

**MATERIALS SCIENCE and NANOTECHNOLOGY**

**GRADUATE PROGRAM SEMINAR**

**“IONIZING RADIATION: A VERSATILE TOOL FOR THE  
SYNTHESIS OF NANOMATERIALS”**

**Prof. Olgun Güven**

Department of Chemistry

Hacettepe University

Since its inception almost half a century ago, radiation processing of polymers has been used to synthesize, modify polymers through its ultimate effects of chain initiation, chain scission, crosslinking, curing and grafting. The ease of manipulating photons or electrons from gamma sources or electron accelerators to create active species at the surface or in the bulk of polymeric materials make radiation processing a technique suitable for both top-down or bottom-up approaches in nanotechnologies. The availability of a range of energies and their precise control make the ionizing radiation a powerful tool in nanostructuring of surfaces or bulk of the materials. The unique advantage of using ionizing radiation in aqueous systems is the simultaneous creation of strongest oxidizing and reducing species in water, namely hydroxyl radical and hydrated electron respectively. While oxidizing agent is very effective in attacking organic compounds with eventual creation of active sites to initiate further chemical reactions and reducing agent very efficiently help reduction of metal ions into nanoparticles of metallic clusters. Among different physical and chemical methods, the advantages of using ionizing radiation in any process lie in the simplicity of the technique, its applicability at any temperature and pressure irrespective of the state of the material and being a clean method. Nanoscale engineering of materials using ionizing radiation involves the preparation of ion track membranes, nanowires, nanogels, metallic nanoparticles, nanocomposites, and radiation-induced grafting for the synthesis of polymeric brushes.

In this presentation, *the unique role that ionizing radiation can play in developing new nanomaterials for medical, environmental and industrial applications* will be highlighted.

**Date : October 22, 2010 (Friday)**

**Time : 15:40**

**Place : Faculty of Science Building, A Block, Seminar Room (SA 240)**

**Tea will be served after the seminar**