

## ***Developing national capacity in radiation technology in Saudi Arabia***

### ***The challenge...***

The Radiation Technology Centre at the Atomic Energy Research Institute in Saudi Arabia's King Abdulaziz City for Science and Technology (KACST) has been carrying out radiation processing of polymers since 1992. The Government of Saudi Arabia has recently established the Nanotechnology Centre in KACST to pursue research and development activities in the field of nanotechnology, which deals with science and technology associated with dimensions in the range of 0.1 to 100 nm. Radiation technologies, already established in materials processing, have properties uniquely suited for the creation and characterization of new functional materials on the nanometre-scale. In order that maximum benefits can be realized in the future, support for the centre's research and development programme activities in nanotechnology was needed.

### ***The project...***

Through the IAEA's technical cooperation programme, three fellowships were awarded and four expert missions were carried out with the prime objective of developing a core group capable of sustaining the Nanotechnology Centre's research programme in this area. The Saudi Fellows received on-the-job training abroad on various aspects of radiation induced chemistry of polymers using electron beams, gamma rays and sono chemistry. The expert missions aimed to familiarize the personnel of KACST with the various initiatives and research work on the application of radiation processing technologies.

The experts also provided advice on the application of nanotechnology to ensure that maximum benefits can be obtained from research and development activities, and presented lectures on topics such as the latest developments in radiation processing of polymers, and current research activities on the use of conventional and radiation techniques for desulphurization of crude oil. This is an application field of immense practical and economic value to the Saudi oil industry. Other research areas covered included nanocomposite coatings to improve scratch resistance, radiation induced conductivity in polymers and novel high dose dosimetry systems for radiation processing applications.

### ***The impact...***

The capacity and the capability of the Saudi counterparts have improved in areas related to radiation technology. KACST is now better prepared to implement the research programme and transfer the know-how to relevant end users and to other research projects related to the application of nanotechnology in the radiation processing of polymers. The results achieved demonstrated that, together with direct applications for oil desulphurization, radiation techniques can be used as efficient subsidiary methods for the regeneration and utilization of hydrorefining catalysts and sorbents. As a result of the technical guidance and training provided through the project, the Saudi research team are now capable of incorporating appropriate nanoparticles in the formulations of coating and composites materials and of defining future research and development programmes of relevance and value to the Saudi economy.

