



# Science Week

April 24-27, 2018 at GSI, Darmstadt

Beitrag ID: 10

Typ: Oral

## Change of Ar diffusion coefficient in glass by heavy ion irradiation

*Mittwoch, 25. April 2018 09:45 (20 Minuten)*

Glass is a function material with free volume. The gas diffusion coefficient in glass is sensitive to atom size and temperature. This feature could be used as a functional filter of gases. In order to enhance Ar diffusion coefficient in glass without changing mechanical property, heavy ion irradiation was applied in this work. Hollow glass microspheres was irradiated with the 15 MeV Si<sup>6+</sup>, at different fluences in between  $1.0 \times 10^{15}$  to  $3.0 \times 10^{16}$  ions/cm<sup>2</sup>. After irradiation, Ar gas was filled into the hollow glass microspheres under different temperature and pressure. X-ray fluorescence (XRF) spectrometer and quadrupole mass spectrometer (QMS) were used to measure the quantity of argon gas in the hollow glass microspheres. A certain amount of argon gas (0.001~3.10 bar) was found in the hollow glass microsphere at different conditions, which related with not only the irradiation fluence, but also the temperature and the pressure. The preserving abilities of filled Ar gases in the hollow glass microsphere were also tested at room temperature. No significant change of insert gas pressure was found after a few months. It implies that the filled Ar has not leaked out. So the diffusion coefficient of glass have been changed and the on/off function to Ar gas in glass has been created with heavy ion irradiation. A theoretical simulation has been carried out to interpret the on/off function. Further approaches with swift heavy ion irradiation is in plan.

**Autor:** Prof. WANG, Tieshan (School of Nuclear Sciecne and Technology, Lanzhou University, Lanzhou, China)

**Co-Autoren:** Herr ZHANG, Bingtao (School of Nuclear Science and Technology, Lanzhou University, Lanzhou, China); Dr. PENG, Haibo (School of Nuclear Science and Technology, Lanzhou University, Lanzhou, China); Dr. CHEN, Liang (School of Nuclear Science and Technology, Lanzhou University, Lanzhou, China); Herr LV, Peng (School of Nuclear Science and Technology, Lanzhou University, Lanzhou, China); Dr. HELLER, Rene (Institute of Ion Beam Physics and materils, Helmholtzzentrum Dresden Rossendorf, Dresden, Germnay); Herr YUAN, Wei (School of Nuclear Science and Technology, Lanzhou University, Lanzhou, China)

**Vortragende(r):** Prof. WANG, Tieshan (School of Nuclear Sciecne and Technology, Lanzhou University, Lanzhou, China)

**Sitzung Einordnung:** Mat Science Week

**Track Klassifizierung:** Annual Workshop on Ion and Particle Beams (Ionenstrahl Workshop)