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# ENERGYPOLIS SEMINAR

**12. 11. 2015, 16:00 - 17:00, ENERGYPOLIS Sion, 4th floor, Seminar room**

## $Mg_2Fe_xSi_{1-x}$ thin films: The interplay between the defects and magnetic structure properties of hydrogenation

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$Mg_2Fe$ hydride belongs to the most promising candidates for application as light weight storage material in a future hydrogen economy [1]. Recently, it has also been shown that due to chemochromism, $Mg_2Fe$ is a low-cost and rare-earth-free candidate for switchable mirrors upon hydrogen loading [2]. Besides the $Mg_2Fe$ hydride, a new compound of $Mg_2Fe_xSi_{1-x}$ will be presented. The additional content of Si promises an optimization of hydrogen absorption and desorption processes. Comprehensive investigations at the facilities of HZDR on $Mg_2Fe_xSi_{1-x}$ system showed that hydrogen induced changes in structure, electronic, optical and magnetic properties. I.e., volume magnetic properties transform from superparamagnetism to ferromagnetism with a high Curie temperature.

As a member of the Helmholtz Association, HZDR provides a unique infrastructure for researchers. Large scale research facilities, i.e. the ion beam center and the linear electron accelerator ELBE of the HZDR are also briefly presented. A suite of materials analysis techniques based on ion beams and the generated radiation of the electron beam is available. A few methods are introduced such as Rutherford Backscattering Spectrometry (RBS), Resonant Nuclear Reaction Analysis (NRA) and Positron annihilation spectroscopy (PAS), which enable the cross-disciplinary collaboration between researchers.

### References:

[1] "Microstructural characterization and hydrogenation study of extruded MgFe alloy". G.F. Lima, M.M. Peres, S. Garroni, M.D. Baró, S. Surinyach, C.S. Kiminami,
T.T. Ishikawa, W.J. Botta, A.M. Jorge. Journal of Alloys and Compounds 504S (2010) S299–S301.
[2] "Mixed metal films with switchable optical properties". T. J. Richardson, J. L. Slack, B. Farangis and M. D. Rubin. Applied Physics Letters 80 (8), (2002) 1349–1351.

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**CV: Thu Trang TRINH**

Born 8th November 1987 in Hanoi, Vietnam.
*(2007 - 2011)* Bachelor of Science (B.Sc.) in physics at Humboldt University in Berlin.
*(2009 - 2011)* Student assistant and Bachelor thesis at "E.ON Ruhrgas " , Thesis title: "Development of a LIDAR (light detecting and ranging) – Laser System for Helicopter Supported Methane Detection ".
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