P36 | **Effect of the initial microstructure on defect evolution in neutron irradiated Fe-Cr-C alloys**

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The irradiation-induced evolution of vacancy type defects in various iron-chromium model alloys and high chromium ferritic/martensitic steels have been studied using coincidence Doppler broadening spectroscopy. Specimens were neutron irradiated to 0.11 dpa at two different temperatures, 300°C and 450°C. It has been found that the microstructure (ferrite vs. ferrite/martensite), more precisely distribution of dissolved carbon within the matrix is one of the key factor that affect response of the materials to neutron irradiation. Presence of dissolved carbon within the matrix leads to formation of stable and immobile carbon-vacancy complexes which act as traps for irradiation induced vacancies and therefore, leading to increased formation of vacancy clusters. Impact of carbon-vacancy complexes on defects evolution during neutron irradiation is relevant only for certain irradiation temperatures.

[1] M.J. Konstantinović, W.V. Renterghem, M. Matijašević, B. Minov, M. Lambrecht, T. Toyama, M. Chiapetto, L. Malerba, *Phys. Stat. Sol. A*. 213/11, 2988 (2016)
[2] C. Domain, C. Becquart, J. Foct, *Phys. Rev. B* 69, 144112 (2004)
[3] M. Matijasević, E. Lucon, A. Almazouzi, *J. Nucl. Mater*. 377, 101 (2008)
[4] V. Slugen, V. Krsjak, W. Egger, M.Petriska, S.Sojak and J. Vetrenikova, *J. Nucl. Mater*. 409, 163 (2011)