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2.2 First Mirror Test in JET for ITER: causes for reflectivity degradation

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Metallic first mirrors will be components for optical spectroscopy and imaging systems in ITER. A comprehensive First Mirror Test (FMT) was carried out in JET with the ITER-Like Wall (ILW): over 60 Mo mirrors facing plasma in the main chamber and in divertor during three ILW campaigns (up to 62 h total). Reflectivity measurements (300-2400 nm) and surface characterization with electron and ion spectroscopy were done before and after exposure. Total reflectivity of mirrors from the main chamber wall is decreased by 2-3% from the initial value. Surfaces are coated by a thin co-deposit (5-15 nm) containing D, Be, C and O. This affected the optically active layer (15-20 nm on Mo) thus leading to the increase of diffuse reflectivity by a factor of 1-2. All mirrors from the divertor (inner, outer, base) lost reflectivity by 20-80%. This result confirms earlier findings, but there are significant differences in the surface state dependent on the mirror location and exposure time, i.e. either single or all three ILW campaigns. This is caused by beryllium-rich deposits. The thickest layers are in the outer divertor: 850 nm. Other elements also are in deposits on all divertor mirrors: O, C, W, and Ni. The comparison between results from JET with carbon and metal wall will be presented.

Primary author(s) : MOON, Sunwoo (Royal Institute of Technology (KTH))

Co-author(s) : PETERSSON, Per (Royal Institute of Technology (KTH)); RUBEL, Marek (Royal Institute of Technology (KTH)); WIDDOWSON, Anna (Culham Centre for Fusion Energy)

Presenter(s) : MOON, Sunwoo (Royal Institute of Technology (KTH)); PETERSSON, Per (Royal Institute of Technology (KTH)); RUBEL, Marek (Royal Institute of Technology (KTH)); WIDDOWSON, Anna (Culham Centre for Fusion Energy)

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