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# Multiple hydrogen trapping by vacancies: Its impact on defect dynamics and hydrogen retention in tungsten

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Tungsten is the prime candidate plasma-facing materials at ITER and DEMO, which would be exposed to high-flux divertor plasmas as well as neutron. Since super-saturation of hydrogen is predicted in the tungsten divertor surfaces, its influence on hydrogen trapping by defects and defect dynamics is an issue.

In this talk, we present studies on 1) multiply hydrogen trapping in a mono-vacancy investigated from first-principles using density functional theories (DFT) and a statistical thermodynamics [1-3], 2) hydrogen trapping effects on di-vacancy formation in tungsten [1,4], 3) transition state theory analysis on thermal desorption of hydrogen atoms in a mono-vacancy [2,5], and 4) carbon impurity interstitial diffusion enhanced by super-saturated hydrogen atoms in tungsten [6].

References

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