

**SINGLE MOLECULE ELECTRON TRANSFER IN SOLID STATE DEVICES:  
STATUS AND CHALLENGES FOR MOLECULAR ELECTRONICS WITH  
SINGLE MOLECULES**

K. Moth-Poulsen, E. Osorio, P. Hedegaard, A. Danilov, S. Kubatkin, E. Lörtshcer, H. Riel, H. van der Zant an T. Bjørnholm

One of the most ultimate and challenging goals of molecular electronics is to understand and master single molecule electronic devices. Based on the latest results employing two and three terminal solid state devices we focus on new insight into the influence of (i) metal electrodes on the molecular energy spectrum, (ii) coupling charge transport to electronic and spin degrees of freedom within the molecule, and (iii) the strength of the electronic coupling between molecule and metal electrode. These parameters control a rich variety of phenomena taking place on the single molecule including simple redox chemistry, ballistic transport, as well as many-particle effects related to the electron charge or spin.