
HL 22: Invited Talk Emil List-Kratochvil

Time: Monday 15:30–16:00

Location: POT 006

Invited Talk

HL 22.1 Mon 15:30 POT 006

Unveiling the origin of resistive switching in organic electronic devices — ●EMIL J.W. LIST-KRATOCHVIL — NanoTecCenter Weiz Forschungsgesellschaft mbH Franz-Pichler-Straße 32 A-8160 Weiz, Austria — Institute of Solid State Physics, TU Graz, Petersgasse 16, Graz, Austria

Electrically tunable resistors realized in two terminal structures seem to be one of the most versatile innovations in the semiconductor industry with many possible applications such as logic circuitry or neuromorphic systems. In particular, inorganic resistive switching devices utilized as memories are close to commercialization. Resistive switching was observed from many organic devices as well, however despite

vital academic interest a consistent explanation about their working mechanisms is still missing. Different models are proposed in this relation, most commonly a) charging/discharging of metallic particles in the an organic matrix and the related formation of a space charge field capable of influencing current injection and b) the formation of highly conductive filaments. We herein present a set of experiments to explain unipolar resistance switching. For the first we are able to unambiguously rule out all charging based models which were held to be responsible for the switching in organic devices and show that the memory behaviour can be interpreted as the formation and rupture of a conductive filament. We demonstrate that unipolar resistive switching is a universal and largely material independent property in electrode/organic/electrode thin-film structures.