# MM 45: HV Winter

Time: Thursday 9:30–10:00 Location: H16

**Invited Talk** MM 45.1 Thu 9:30 H16

**"Novel" Materials for Lithium Ion Batteries and "Beyond-Lithium Ion Batteries"** — •Martin Winter and Stefano Passerini — Institute for Physical Chemistry, University of Münster, Corrensstrasse 28/30, D-48149 Münster, Deutschland

Is it possible to drive 1000 km with one (present technology) battery charge? The answer to this question is presently: NO. In fact, the energy need of a mid-size car (weight: 1500kg) is about 18kWh/100km. Thus, even considering the most optimistic estimation on the development of Li-Ion batteries (200Wh/kg), which would correspond to more than 33% of the theoretical specific energy calculated on the active material weight only, it is clear that the 1000km range cannot be achieved with Li-ion (the battery weight would be more than 900kg). A revolutionary rather than evolutionary approach needs to be considered to achieve the 1000km driving range. Specific capacities close or above 1000 Ah/kg are needed for both electrodes in order to get cell specific energies at or above 1000Wh/kg. Lithium metal/element chemistries (Li/S, Li/O2 etc.) are promising to provide such high capacity, however, the long-term cycling stability of lithium metal anodes has been, so far, proved only at low charge regimes. The solution to the 1000km driving range might rely on the combination of a high energy Li/Element battery with a fast dynamic Li-Ion battery. Only "new" materials are the key to reach such a hybrid system consisting out of two batteries. This will be discussed.