

## **Challenges in materials science for a sustainable "habitat"**

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We will introduce the emerging scientific challenges that we foresee in the different fields of sustainable buildings. Within the next decade energy passive or energy positive housing is going to be the main driver for innovation in materials for the housing sector. This talk will focus on energy efficiency however additional constraints like recycling and access to resources will also be evoked.

The cheapest and most environmental energy is the one you do not use. Therefore, there is an important potential in the energy optimisation in buildings. Modern insulation materials have already made considerable progress allow. However, new physical concepts and materials are needed to bring about super insulating materials. We will discuss the fundamental aspects of thin highly insulating transparent or opaque materials. Aside heating lighting is an important aspect of the energy consummation of a building. The perspective for solid state lightning technologys like LED or OLEDs will be discussed as well as some of the emerging technologies and their bottlenecks. We will finally discuss the potential for adding photovoltaics systems to buildings to attain energy positive housing and the need for photonic materials and functional surfaces.