



## Nanostructured materials for solar hydrogen production

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**Abstract** One of the main requirements for a future Hydrogen Economy is a clean and efficient process for producing hydrogen using renewable energy sources. Hydrogen is a promising energy carrier because of its high energy content and clean combustion. In particular, the production of hydrogen from water and solar energy, i.e., photocatalysis and photoelectrolysis, represent methods for both renewable and sustainable energy production. Here, we will present the principles of photocatalysis and the PhotoElectroChemical cell (PEC cell) for water splitting, along with functional materials. Defect chemical aspects will be high-lighted. To date, the decreasing length scale to the nanoscale of the functional materials attracts widespread attention. The nanostructure is beneficial in case diffusion lengths of the photo-generated charge carriers are substantially different.

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