

Plasmas for energy, 2 ways: *Fusion and thin layer solar cells.*

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Abstract

The success of nuclear fusion has been reached in a long path with its difficulties and hopes, as Bohm-diffusion, density rise, impurities, L-regime, on one side and transport barriers, pulsed gas feed, H-regime at the other side. All these by the time seemingly hopeless problems have been overcome in time. By strong collaborative work and by alertness for accidentally found solutions the energy life time has been improved by orders of magnitude and fusion proves possible.

For solar cell a similar development takes place with again difficulties as insufficient efficiency, stability and too low production rates. As in fusion the charge carrier lifetime is the key issue. For significant contribution the cells must be thin and still have excellent material properties and the layers must be deposited with high rates at the same time. The potential of the plasma medium, the freedom of material and of morphology, the possibility of change of material on nanometer scale offers certainly the possibilities to address these issues. This forms a new challenge for plasma physics, as demanding and rewarding as fusion, for the Terawatt revolution [1].

[1] R.E. Smalley, Future Global Energy Prosperity, the Terawatt Challenge, M.R.S. Bulletin **30** (2005) 412