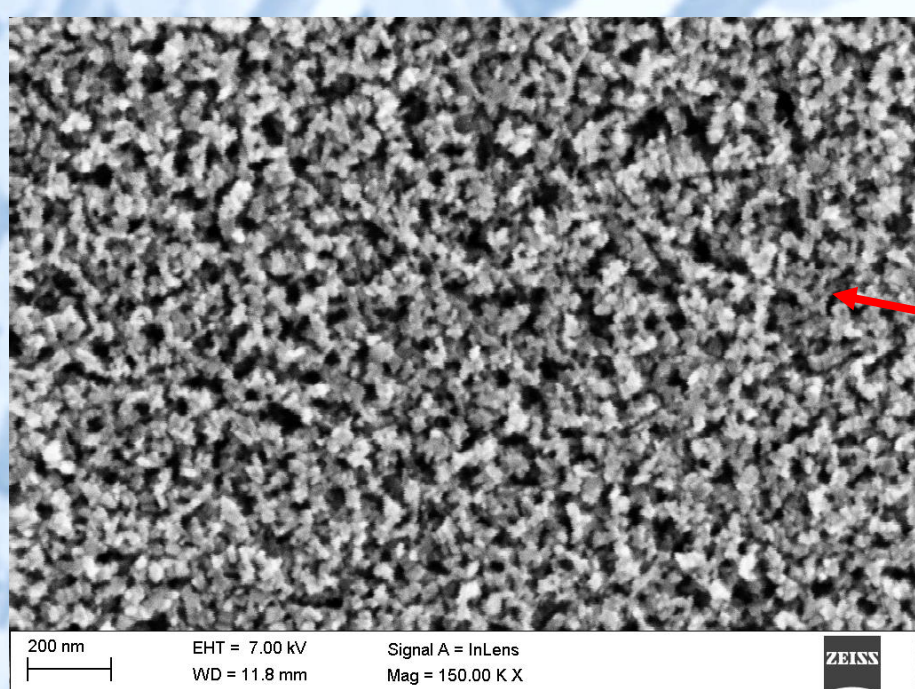
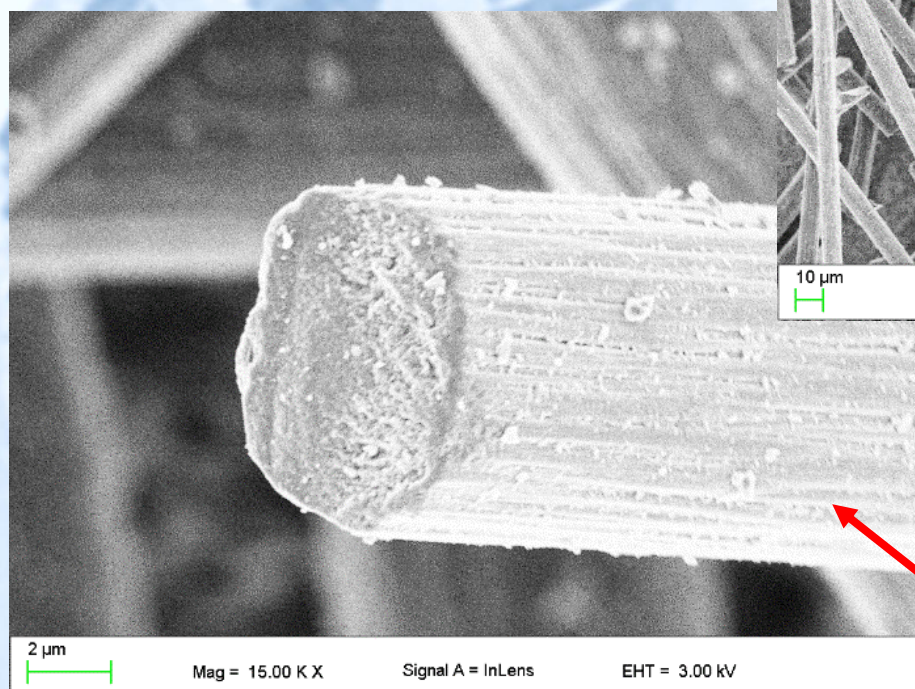
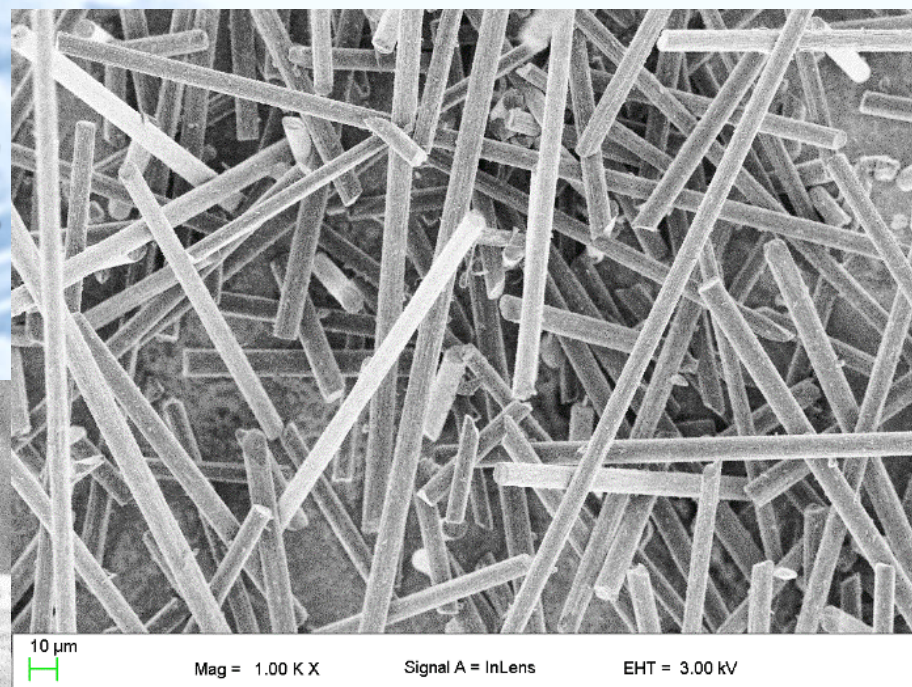


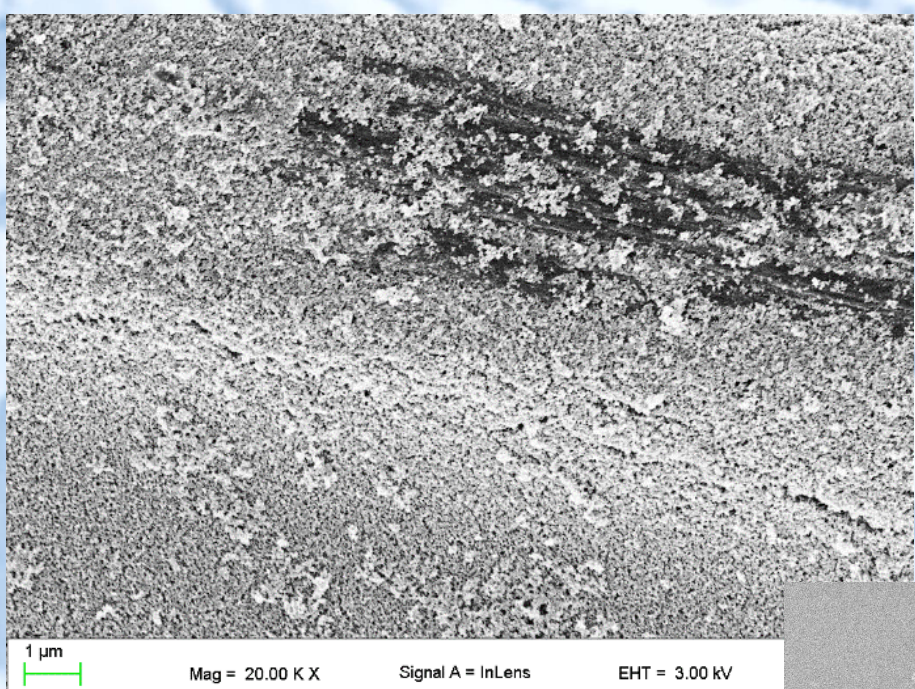
Transparent dye-sensitized solar cells with carbon fibers as efficient photoanode material

Aleksandra Drygała, Sabina Lesz, Adam Zarychta, Wojciech Pakieła

Morphology of carbon fibers applied in DSSC photoanode



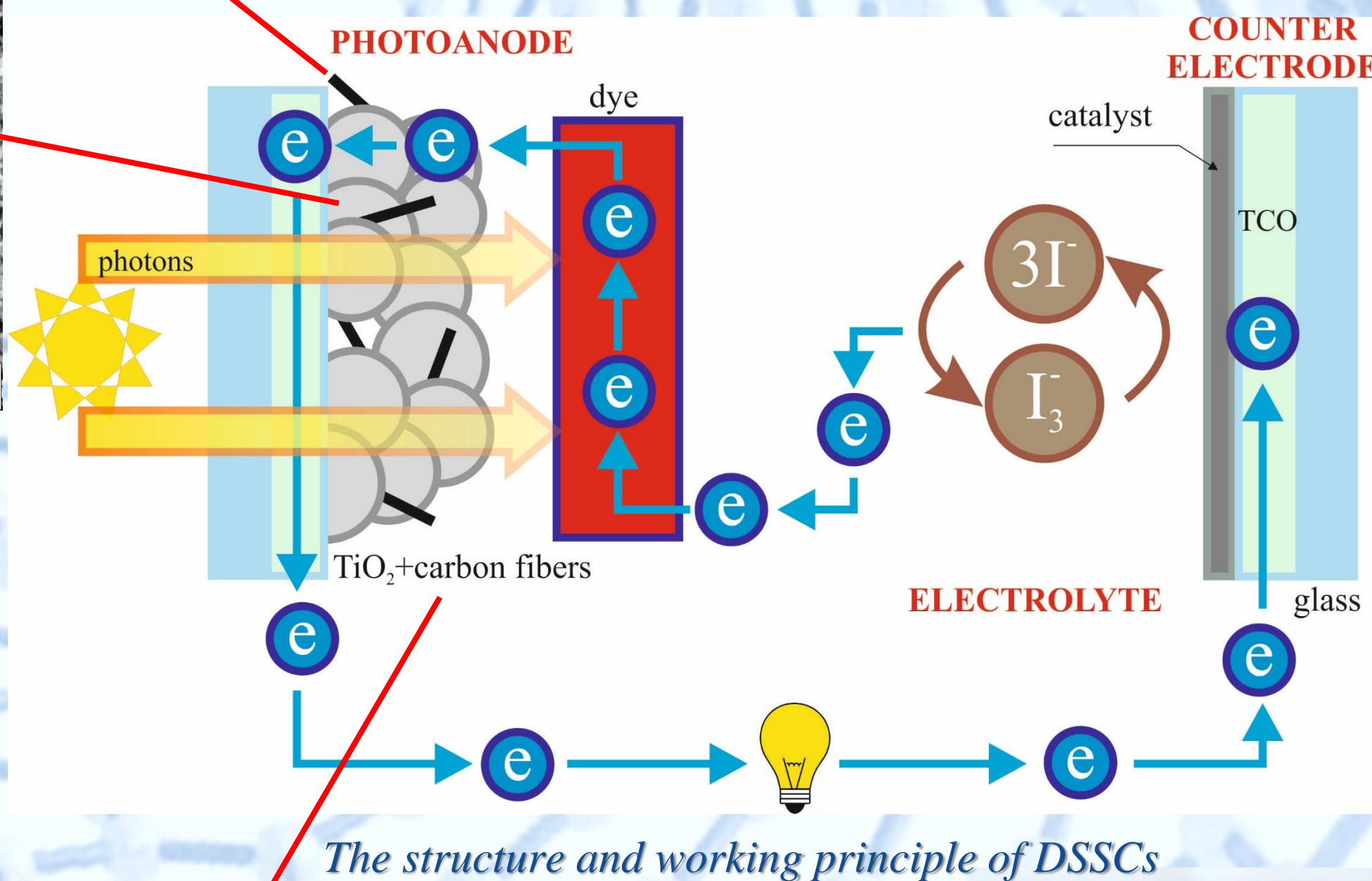
Topography of TiO₂ layer



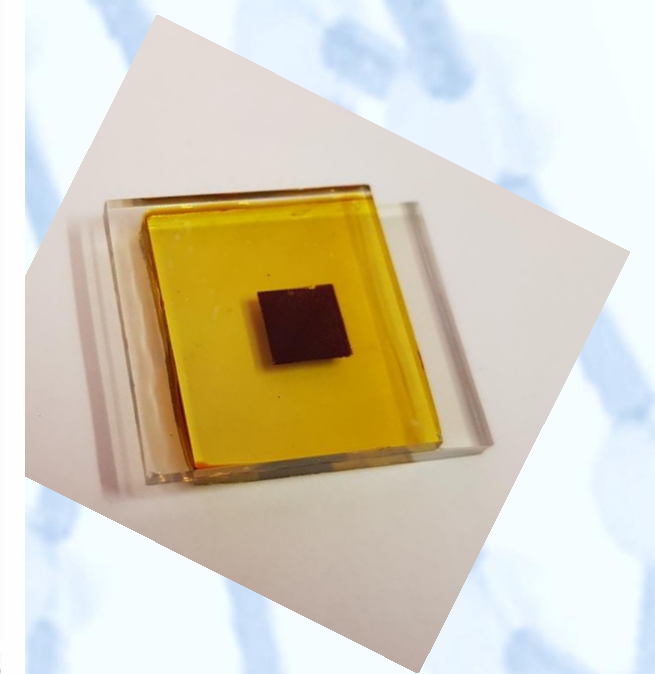
Topography of TiO₂ layer with carbon fibers



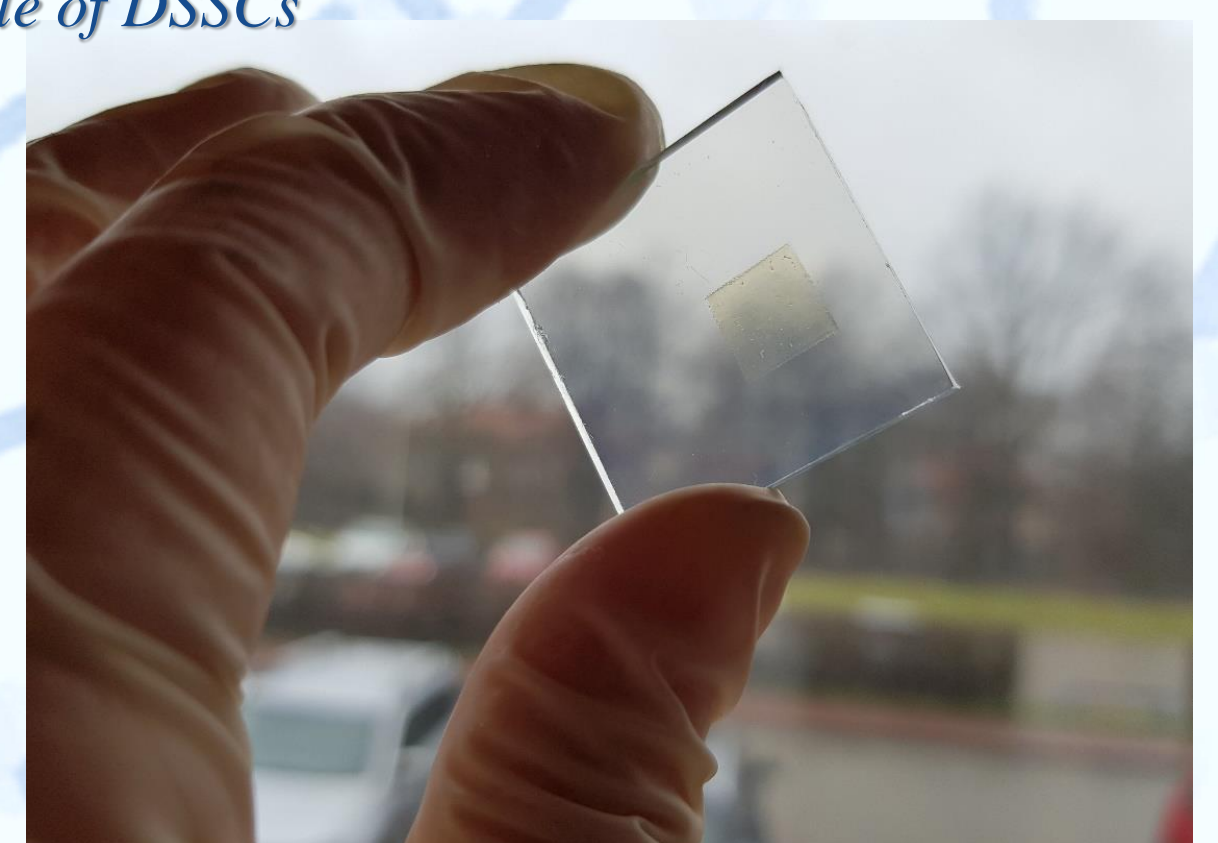
In this invention TiO₂/carbon fibers mesoporous layer can be employed as a new alternative photoanode in dye-sensitized solar cells (DSSC). This kind of photovoltaic device consists of photoanode, redox electrolyte, and counter electrode. TiO₂/carbon fibers layer acts as a scaffold to adsorbed dye molecules and transports the electron - photogenerated by light absorption. The morphology, particle/wire and pore size of photoanode componens play critical roles in photoelectron diffusion and conversion efficiency of DSSC.



The structure and working principle of DSSCs



Produced DSSC



Transparent photoanode of DSSCs with carbon fibers

Dye-sensitized solar cells (DSSCs) provide a promising alternative to conventional p-n junction photovoltaic devices due to their simple manufacturing process, low cost of materials, light weight, good photovoltaic properties, specifically under low-light conditions, short energy payback time, and low environmental impact.

Comparison of electrical properties of dye-sensitized solar cells with TiO₂ and TiO₂/carbon fibers photoanodes

Type of DSSCs photoanode	I _{sc} [mA]	V _{oc} [mV]	FF	E _{ff} [%]
TiO ₂	4.83	668	0.58	4.36
TiO ₂ /carbon fibers	5.32	685	0.61	5.28