How to enhance the efficiency in CdTe & other polycrystalline mosaic solar cells?

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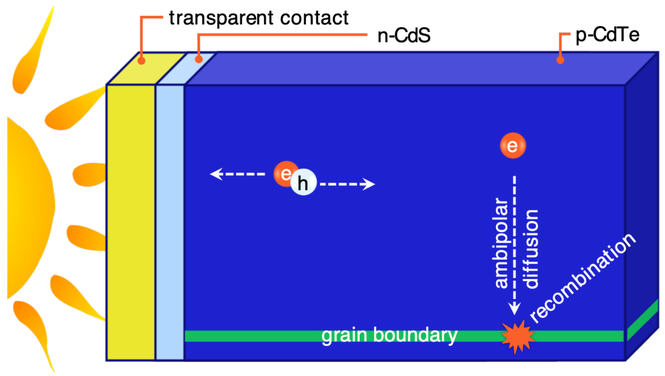
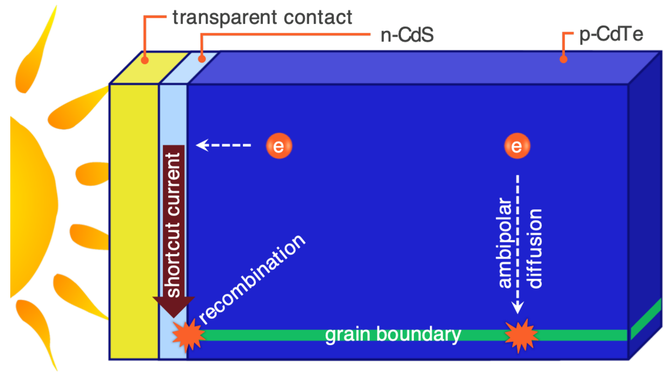
Photocarriers recombine primarily at the grain boundaries

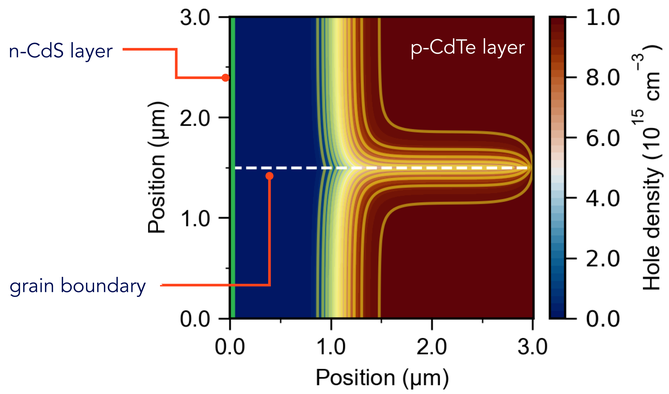


Note: cadmium sulfide – CdS; cadmium telluride – CdTe

Recombination at the "hot spot" lowers the solar cell efficiency by 1%

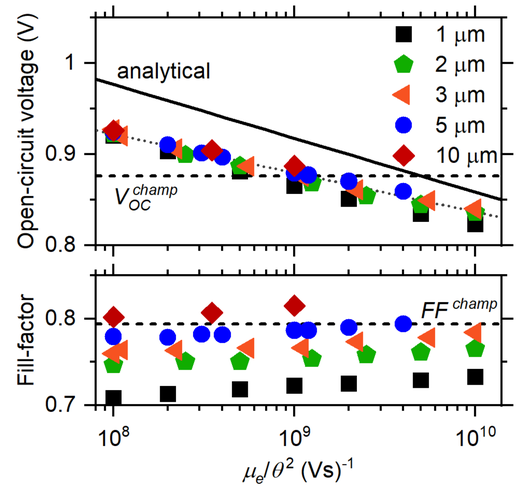


Contour map of the hole density of the CdS/CdTe solar cell in the dark



- **assumption** – the grain boundary depletion width ($0.1\ \mu m$) is much smaller than the grain width ($\theta = 3\ \mu m$)

Lower mobilities (μe) for higher photovoltages & bigger grains for bigger fill-factors (FF)



Eliminating the hot spot would yield higher photovoltages and more efficient solar cells!

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