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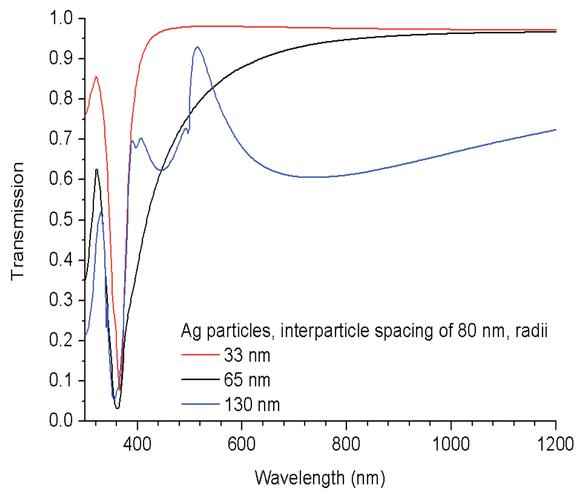
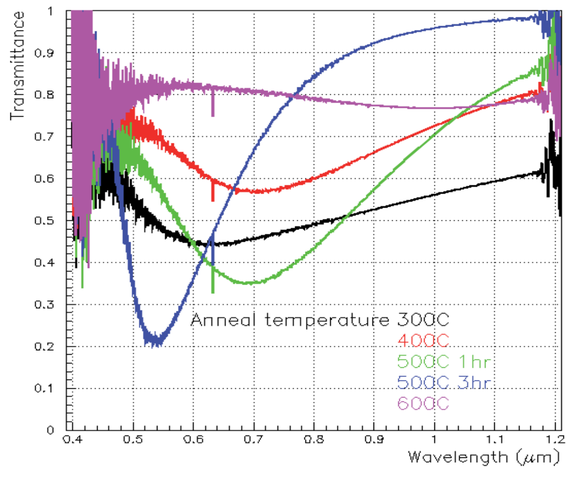
Improve Photovoltaic efficiency by applying novel effects at the limits of light to matter interaction

SEVENTH FRAMEWORK PROGRAMME

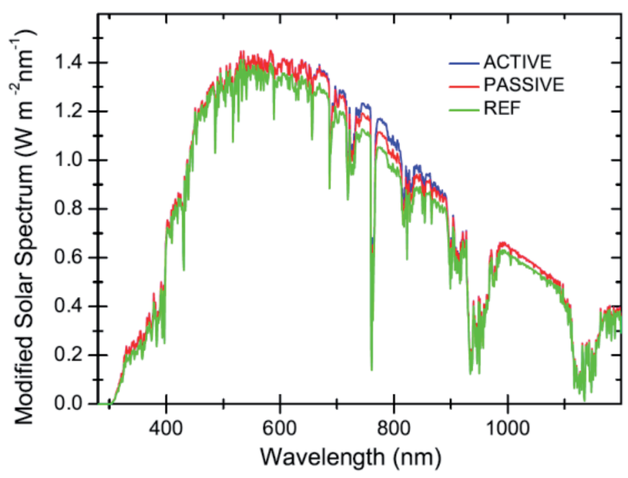
The LIMA project exploits new and emerging concepts of light-matter interaction (Plasmonic layers and Quantum Dots) to enhance Interdigitated Back Contact (IBC) solar cell efficiencies.



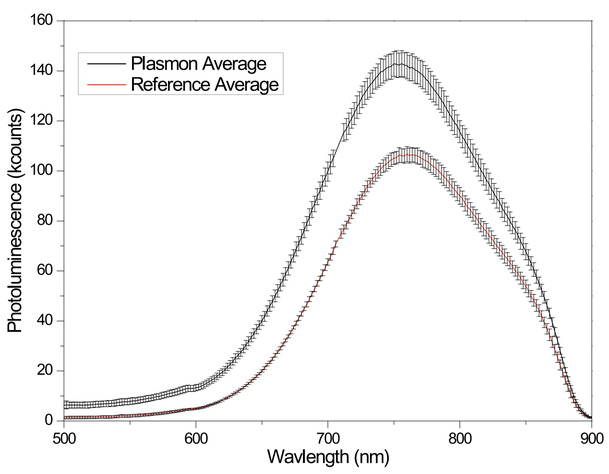
Optimum particle size and distribution.



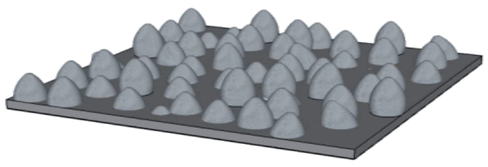
Transmission results of several plasmonic samples.



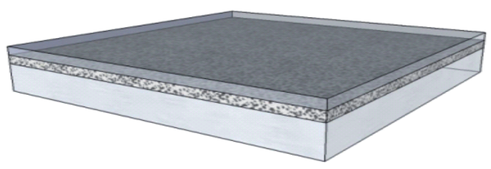
Calculated modified spectrum.
Active (10% eff. Downshifting).
Passive (SiO /SRO layers without down shifting).
Ref (SiO AR layer).



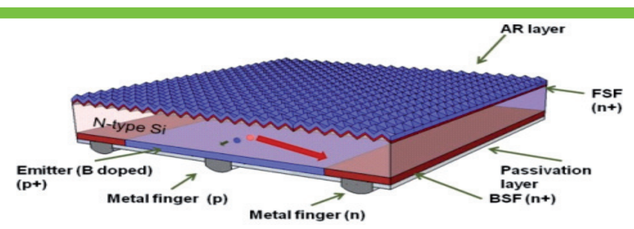
Photoluminescence of a Si-QD sample with and without plasmonic layer.



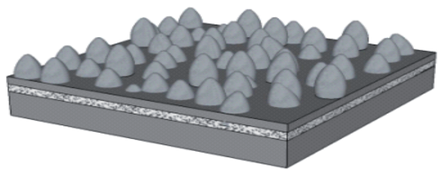
Plasmoniclayer (WP3)



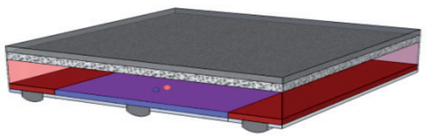
Quantum dots layer (WP2)



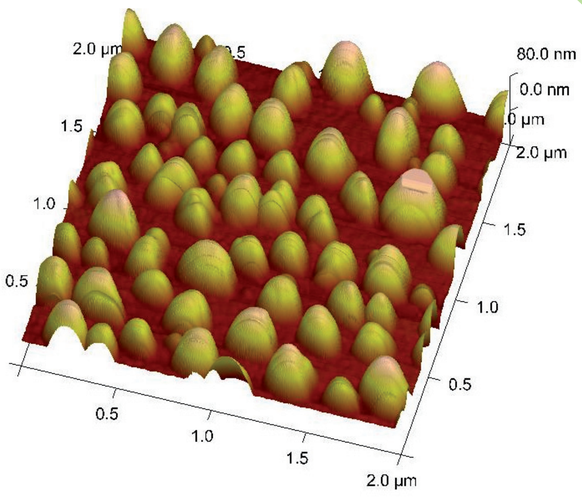
IBC solar cell (WP4)



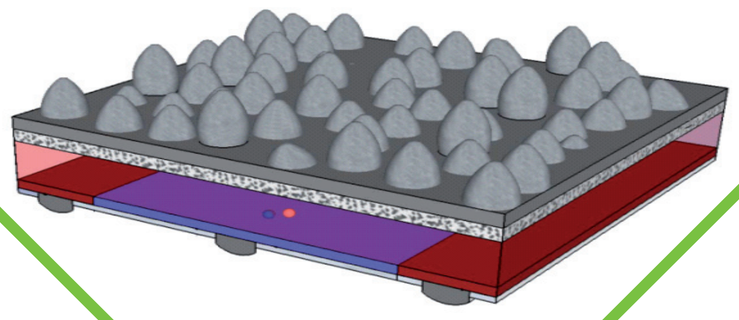
Qds + Plasmonics
Photoluminicense



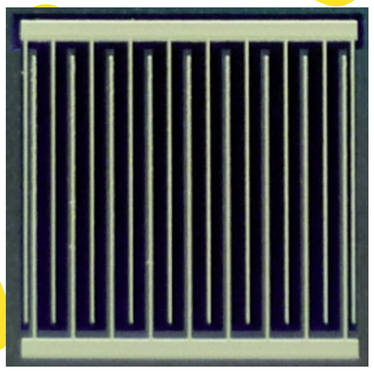
IBC + Qds
Modified spectrum



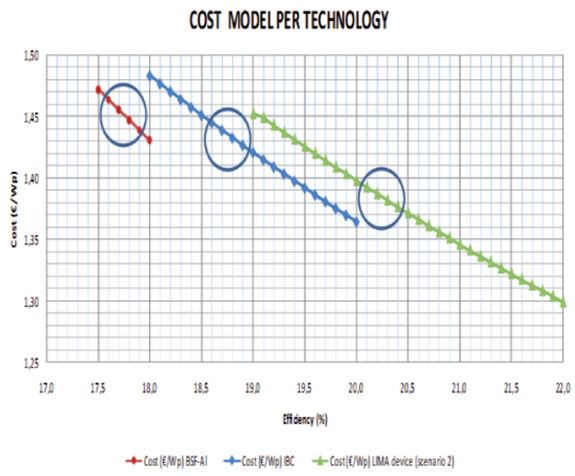
AFM image of the plasmonic layer.

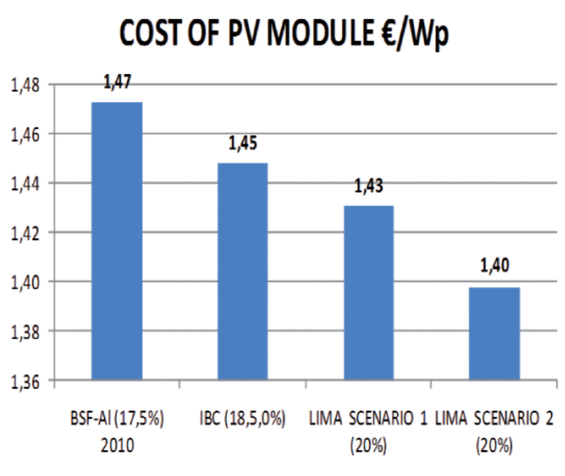


Final IBC device

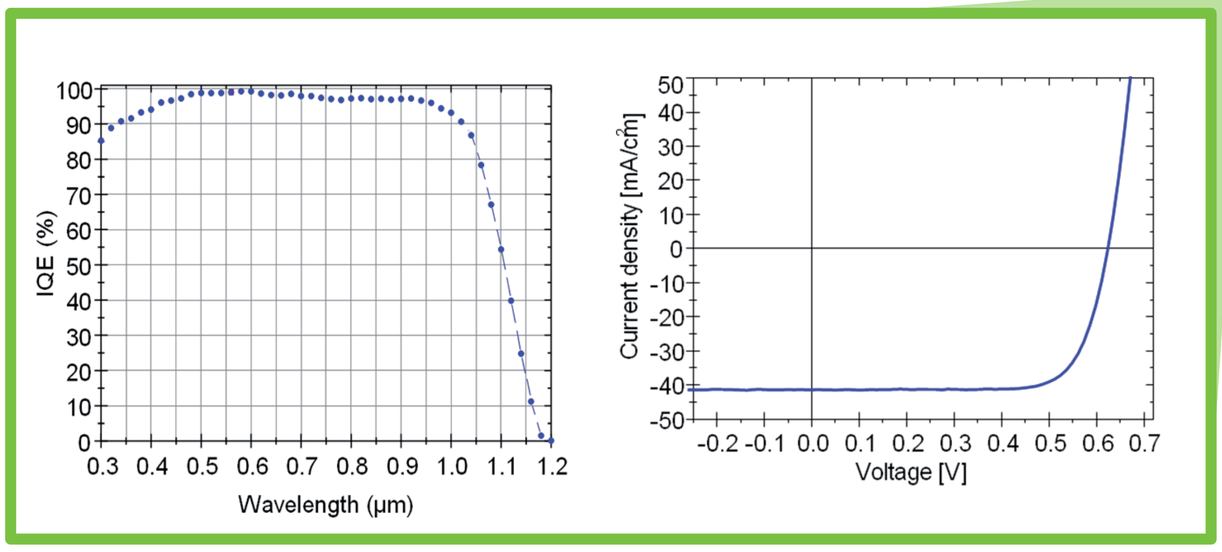


IBC 2x2 mm2 solar cell





The economical viability of the device was obtained considering a cost bellow 1,43 Euros/Wp at module level.



Illuminated IV-curve and spectral response (IQE) of the best IBC cell with an efficiency of 19.6% (Voc=624mV, Jsc=41.4mA/cm2; FF=75.7%)

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