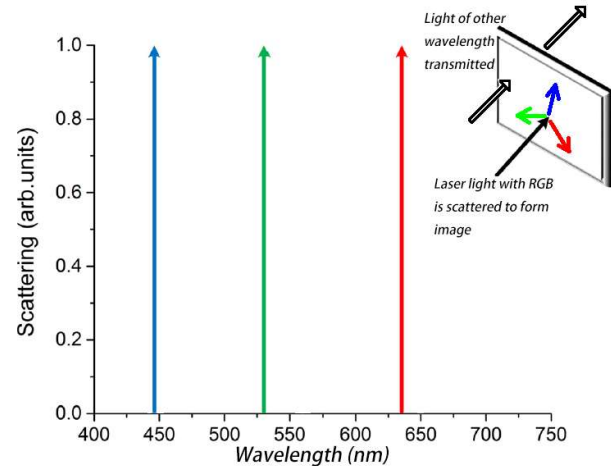


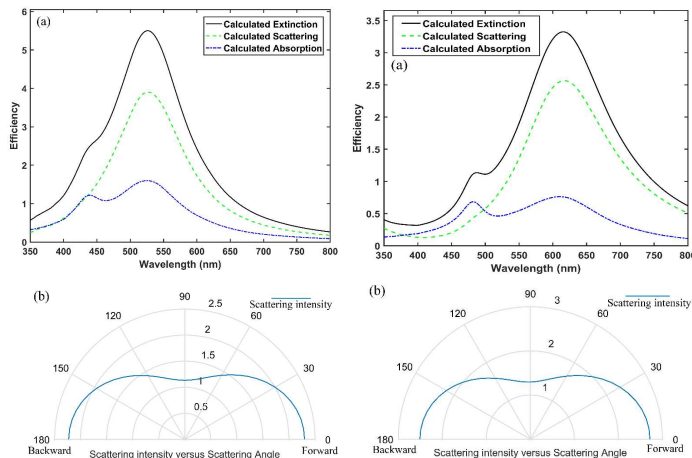
Resonant scattering of green light enabled by $Ag@TiO_2$ and its application in green light projection

Background & Motivation

- The ability to selectively scatter red, green and blue light is essential for RGB transparent projection.
- Only selective scattering of blue light by Ag nanosphere based on LSPR effect has been reported so far.
- It is necessary to find nanoparticles that selectively scatter green and red light.
- In this work, we have achieved selective scattering of green light using the $Ag@TiO_2$ nanostructures



Structure optimization

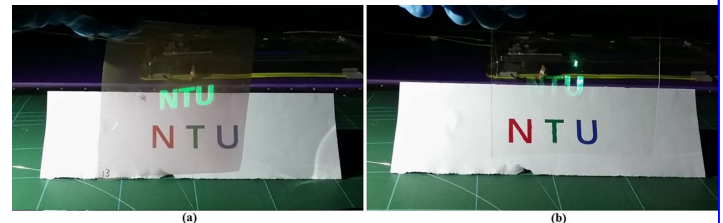


Structure optimization for selective scattering of green light

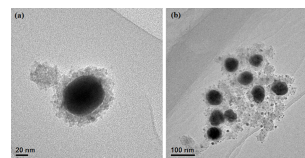
Structure optimization for selective scattering of red light (to be realized in future)

- Three tunable parameters during optimization: core diameter, shell thickness, a small range of resonance wavelength.
- Optimization criteria: low absorption everywhere in visible range, high scattering at the resonance wavelength and low at wavelengths away from resonance

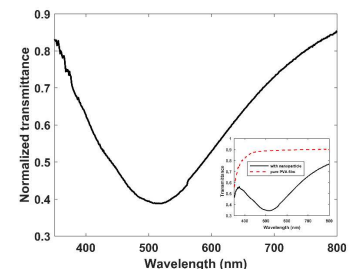
Experimental verification



Demonstration of the transparent nanoparticle-PVA film which selectively scatters green light (a). A pure PVA film without nanoparticles is shown for comparison (b). The images were projected by a laser projector (SONY MP-CL1A).



TEM images of the nanoparticles with average core diameter of 67 nm, average shell thickness of 18 nm.



The sample film shows an average transmittance of 60.38%.

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