Abstract
Spectrally selective nanocoatings that exhibit synergistically enhanced solar light modulation, luminous transmittance and catalytic properties can be made by combining dielectric film stacks with complementary optical and structural properties. Here we show two case studies:

1) **TiO₂/VO₂ luminous transparent bilayers** that exhibit enhanced near-infrared light absorption and heats the TiO₂ film by up to ∼30°C resulting in 2-fold increase of the photocatalytic reaction rate. The TiO₂/VO₂ bilayer stack exhibits anti-reflective properties, and enhanced solar light modulation (∼9%) compared to VO₂, and ∼20 times% increased solar absorptance compared to TiO₂. In addition the TiO₂ chemically protects the VO₂ layer avoiding oxidation to vanadium pentoxide.

2) **TiO₂/TiAlN solar absorber bilayers** that yield an almost ∼10-fold enhancement of the quantum yield for acetaldehyde removal (on par with state-of-the-art, heterojunction photocatalysts), and an associated temperature rise ∼120°C.

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