

Fig.1: Refractory solar selective coating concept. Porous transparent material (e.g. SiO_2) serves as a photonic crystal scaffold for the subsequent ALD. Scaffold is infiltrated via ALD with a nanophase composite film to create a selective absorbing coating for concentrated solar power receivers.

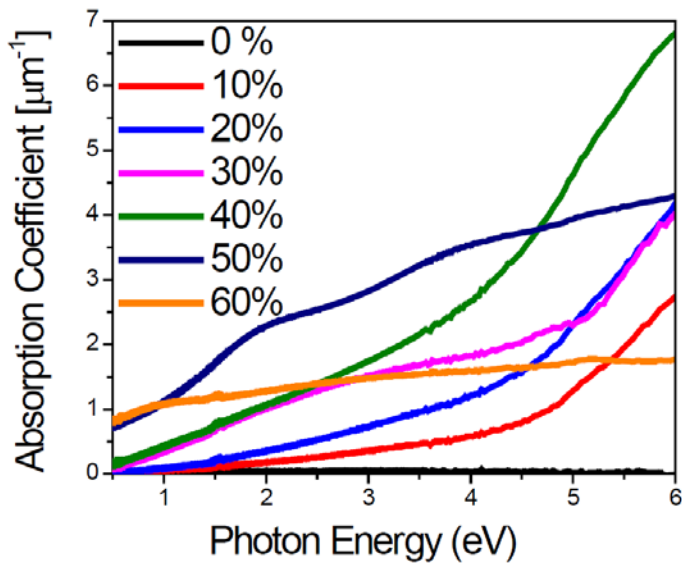


Fig.2: Absorption spectra for ALD $\text{W:Al}_2\text{O}_3$ nanocomposite films having different W cycle percentages (% W). Below $\sim 40\% \text{W}$, the films act as selective absorbers: absorbing visible light, but transmitting IR light.

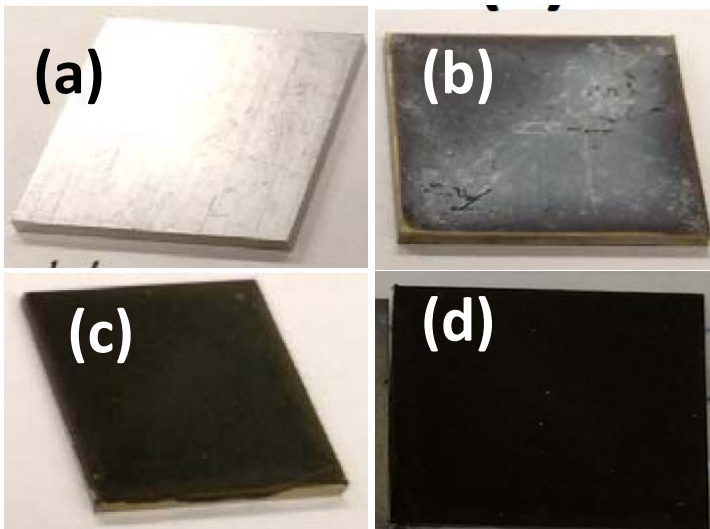


Fig.3: Photographs of (a) superalloy metal coupon; (b) metal coupon with porous photonic scaffold; (c) scaffold after infiltrating with 20 nm, 33% ALD $\text{W:Al}_2\text{O}_3$ nanocomposite film; (d) same sample after 24 hours at 650°C in air. Our coating remains highly optically absorbing after heat treatment.