Electronic Supplementary Material (ESI) for RSC Advances.

	hkl	Bragg Angle 2θ/°	Peak Width 'β'/°	Diameter/nm	Average diameter / nm
ZrO_2	111	30.27	1.118	7	8
	200	35.14	0.893	9	
	220	50.50	1.445	6	
TiO_2	101	25.29	0.274	30	28
	200	48.03	0.317	27	
	211	55.06	0.335	27	
ZrO_2 - TiO_2 composite	101	24.99	0.440	19	16
	111	30.89	0.623	13	

Table 1: Shows the calculated crystallite size in the ZrO_2, TiO_2 and ZrO_2 – TiO_2 composite films grown via AACVD.

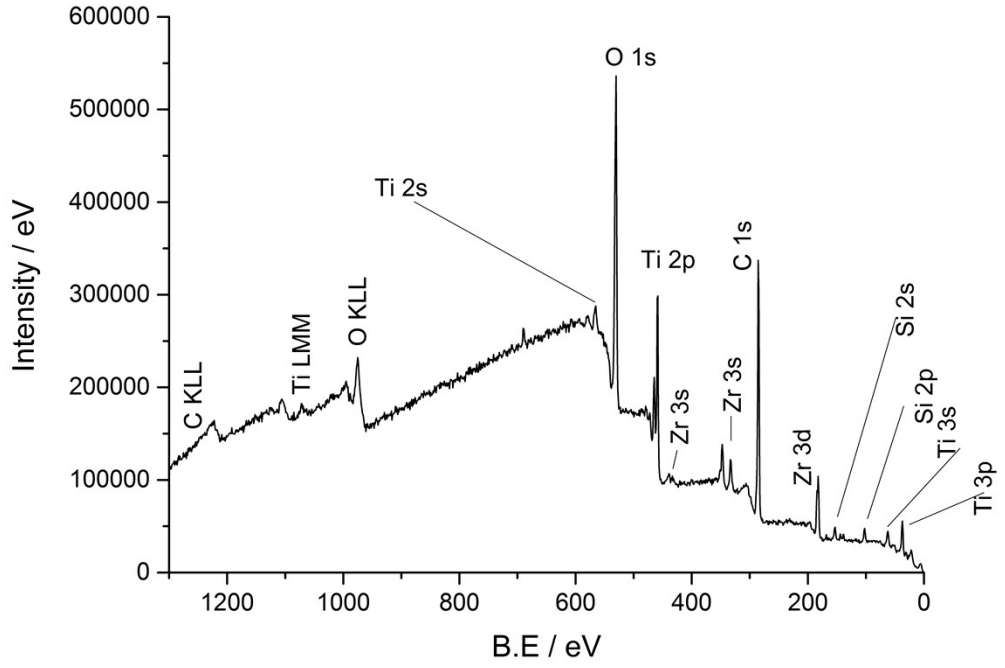


Figure 1: The survey scan for the ZrO_2 – TiO_2 film grown via AACVD. The surface of the film was free of all contaminants other than Si (from silicon grease).

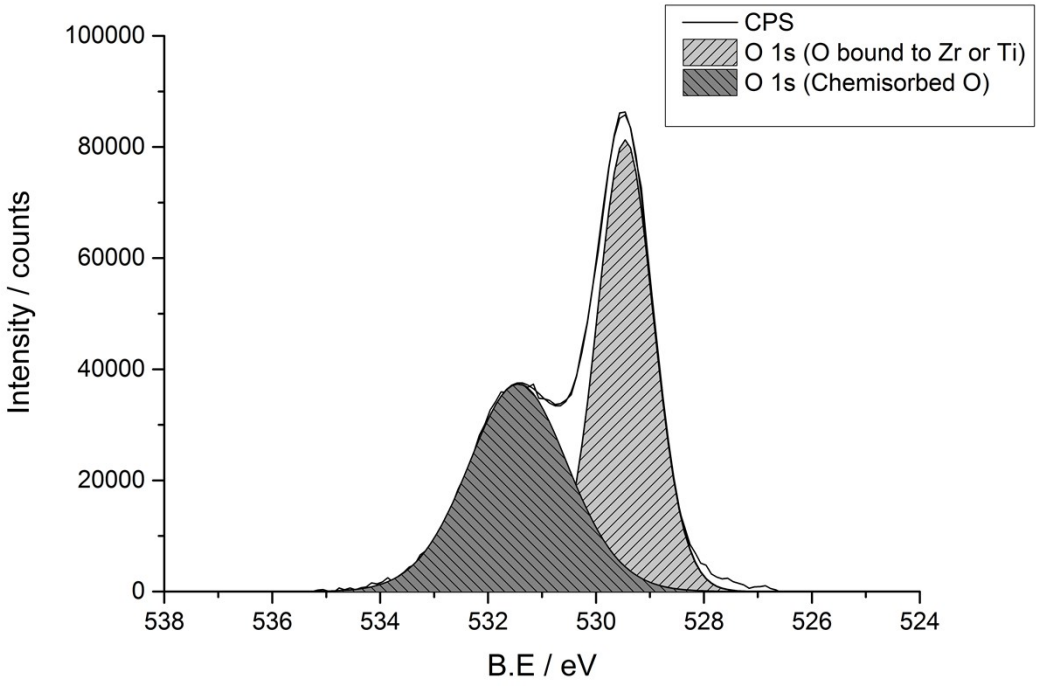


Figure 2: The O 1s XPS spectrum for the ZrO – TiO_2 composite film. The raw data was deconvoluted to give two oxygen environments corresponding to O bound to Zr or Ti as well as chemisorbed oxygen.

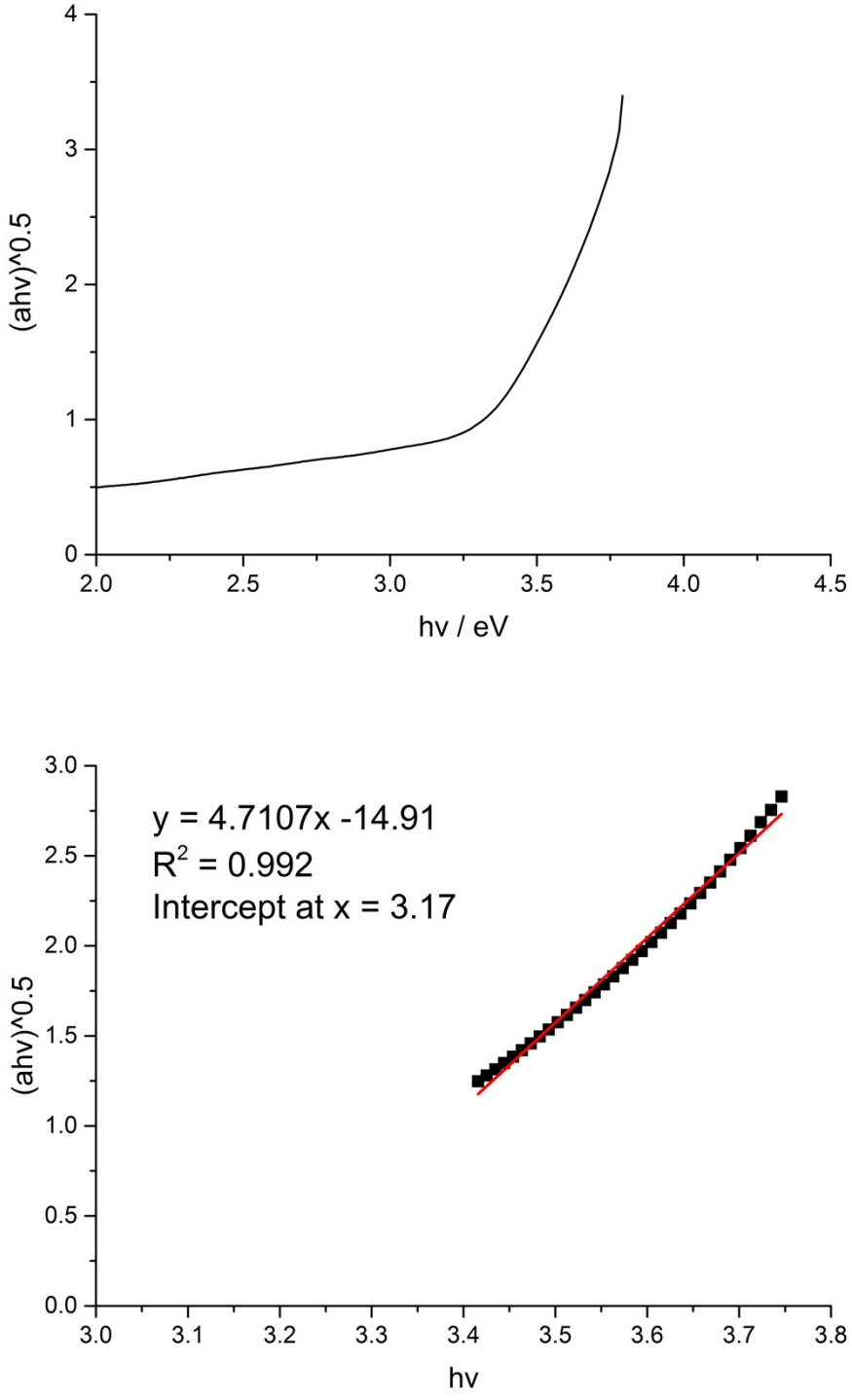
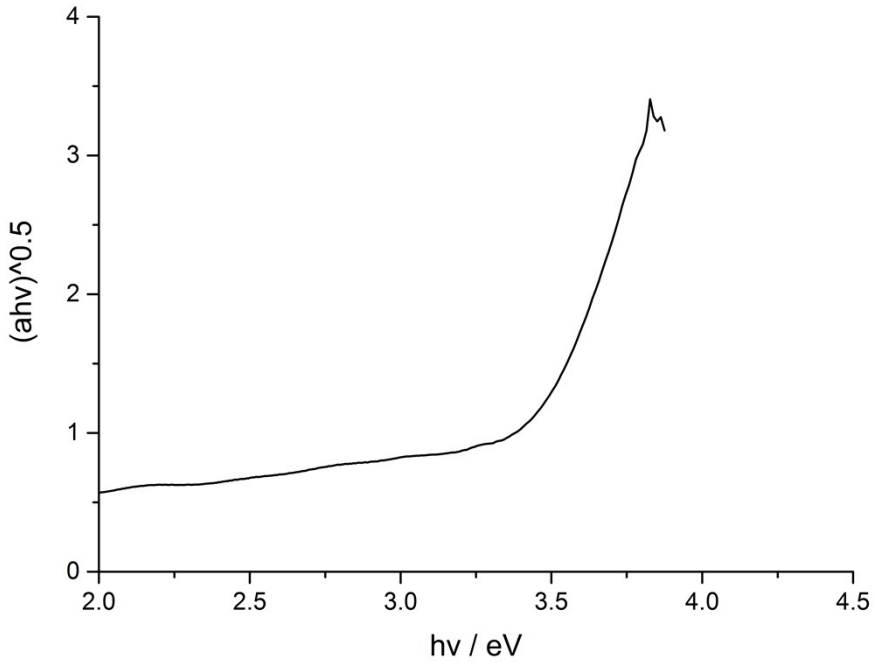


Figure 3: Above) the Tauc plot for the anatase TiO_2 film. Below) linear regression applied to the steepest part of the Tauc plot shows an indirect bandgap of 3.2 eV.



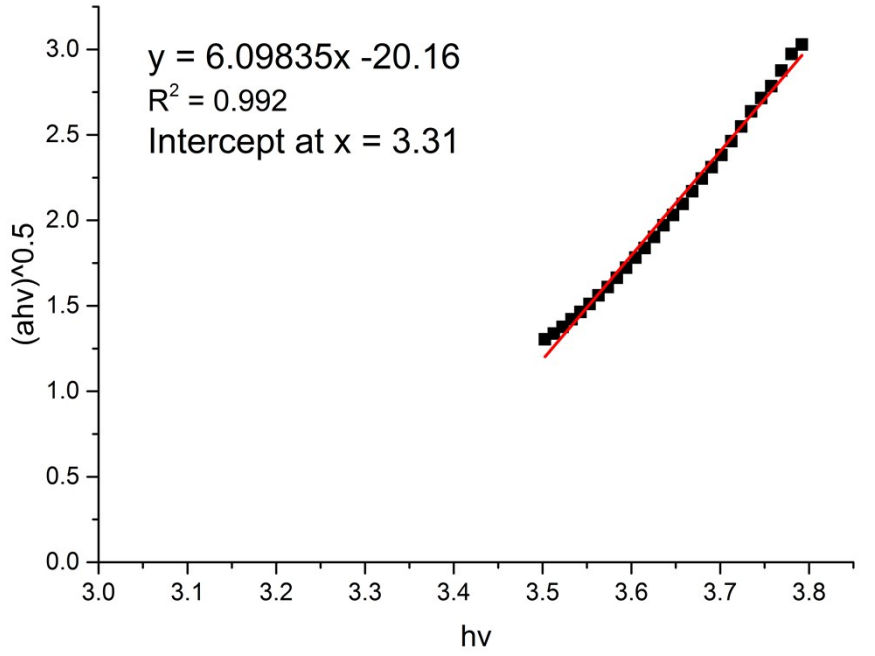


Figure 4: Above) the Tauc plot for the composite ZrO_2 – TiO_2 film. Below) linear regression applied to the steepest part of the Tauc plot shows an indirect bandgap of 3.3 eV - corresponding to the anatase phase of the film.

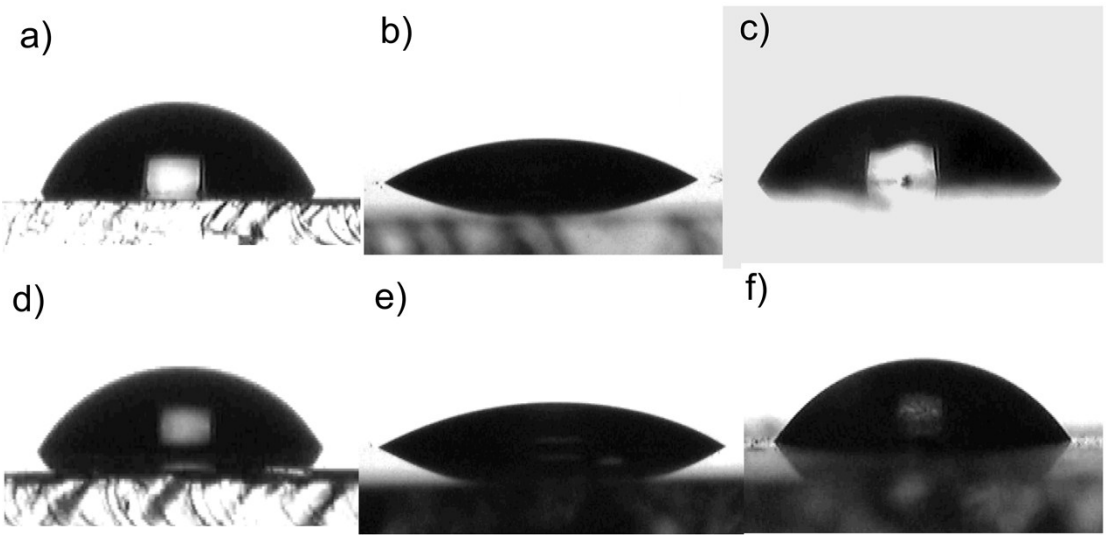


Figure 5: The water contact angle measurements pre and post irradiation with UVA radiation (flux= 3.67× 10^{14} photons per cm^2 per s) for 16 hours. Pre irradiation a) ZrO_2, TiO_2 and ZrO_2 – TiO_2 composite. Post irradiation d) ZrO_2 e) TiO_2 and f) ZrO_2 – TiO_2 composite.