Electronic Supplementary Material (ESI) for RSC Advances.

Clay/$CoAl_2O_4$ hybrid pigments: Effect of different clay minerals and calcination temperature on the morphology and color

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Table S1 The composition of three clays determined by X-ray fluorescence

Composition / Clay	Al_2O_3	MgO	CaO	SiO_2	K_2O	Fe_2O_3
APT	10.47%	20.41%	1.29%	64.31%	0.13%	0.87%
I-S	18.27%	1.87%	0.23%	65.93%	3.15%	3.53%
MMT	17.14%	3.87%	0.46%	68.62%	1.62%	1.48%

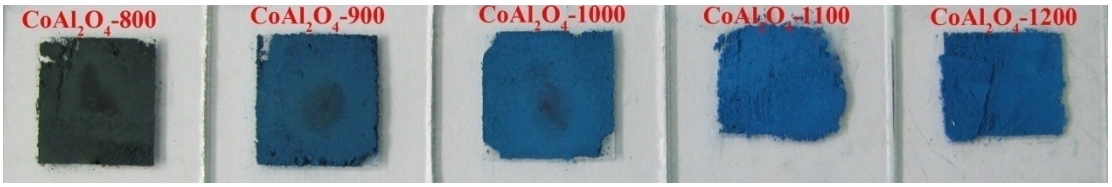

Fig. S1 Digital photographs of $CoAl_2O_4$ pigment: $CoAl_2O_4$-800, $CoAl_2O_4$-900, $CoAl_2O_4$-1000, $CoAl_2O_4$-1100, and $CoAl_2O_4$-1200.

Fig. S2 Digital photographs of the natural APT and the calcined APT at different temperatures.

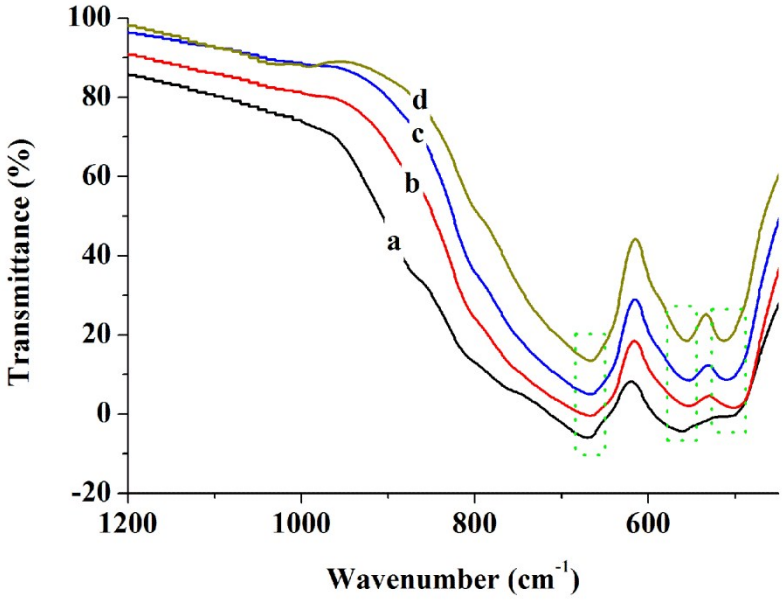

Fig. S3 FTIR spectra of a) $CoAl_2O_4$-800, b) $CoAl_2O_4$-900, c) $CoAl_2O_4$-1000, and d) $CoAl_2O_4$-1200.

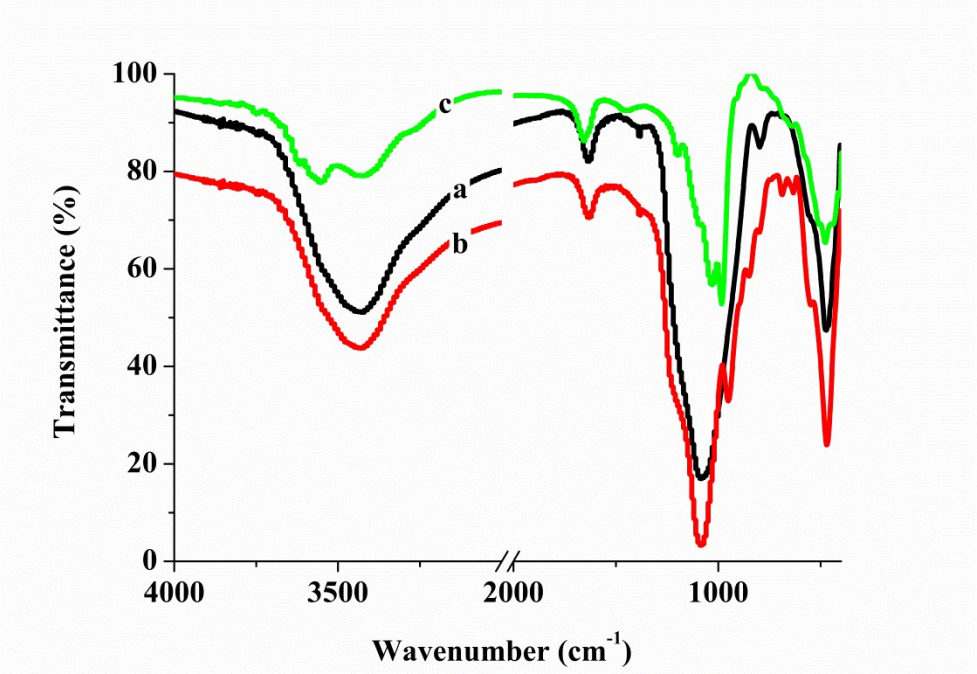

Fig. S4 FTIR spectra of a) the natural APT and the calcined APT at 800 °C (b) and 1000 °C (c).

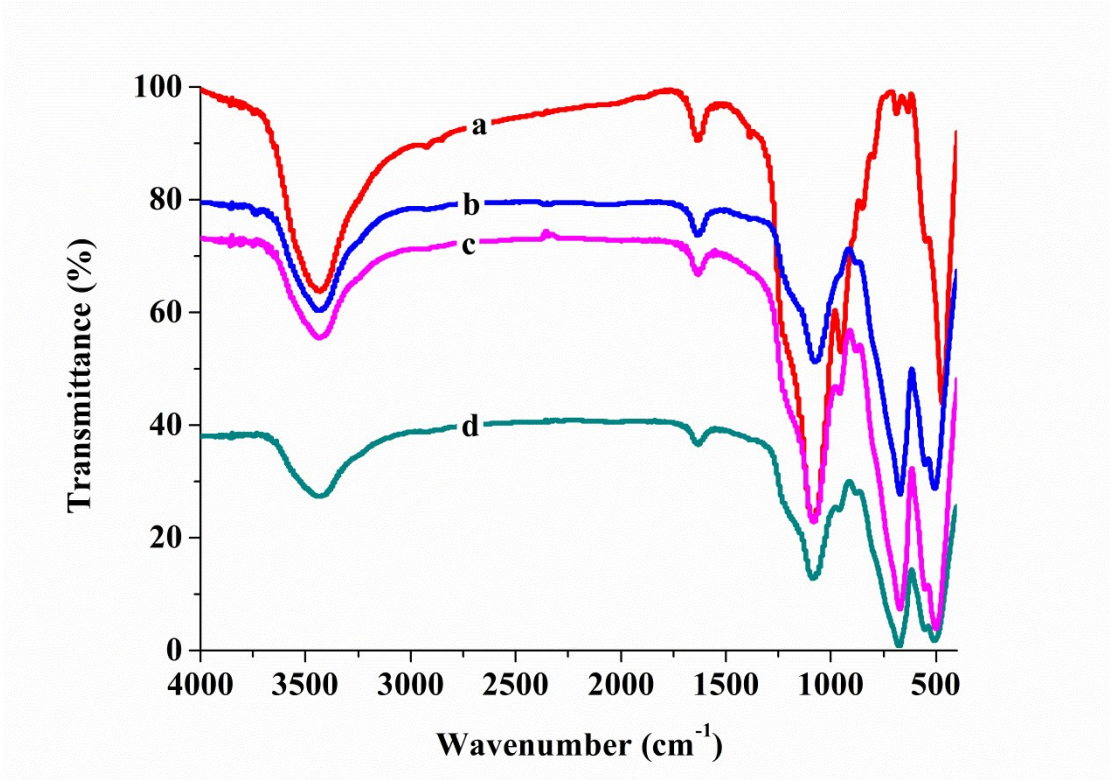

Fig. S5 FTIR spectra of a) the calcined APT at 1000 °C, b) APT/$CoAl_2O_4$-1-1000, c) APT/$CoAl_2O_4$-2-1000, and d) APT/$CoAl_2O_4$-3-1000.

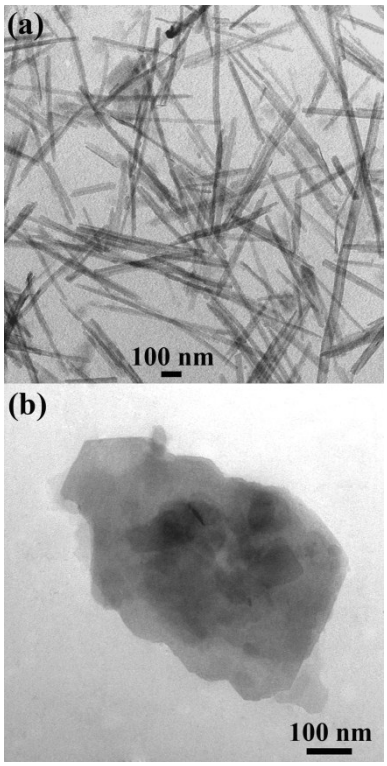

Fig. S6 TEM images of (a) the natural APT and (b) the natural I-S.

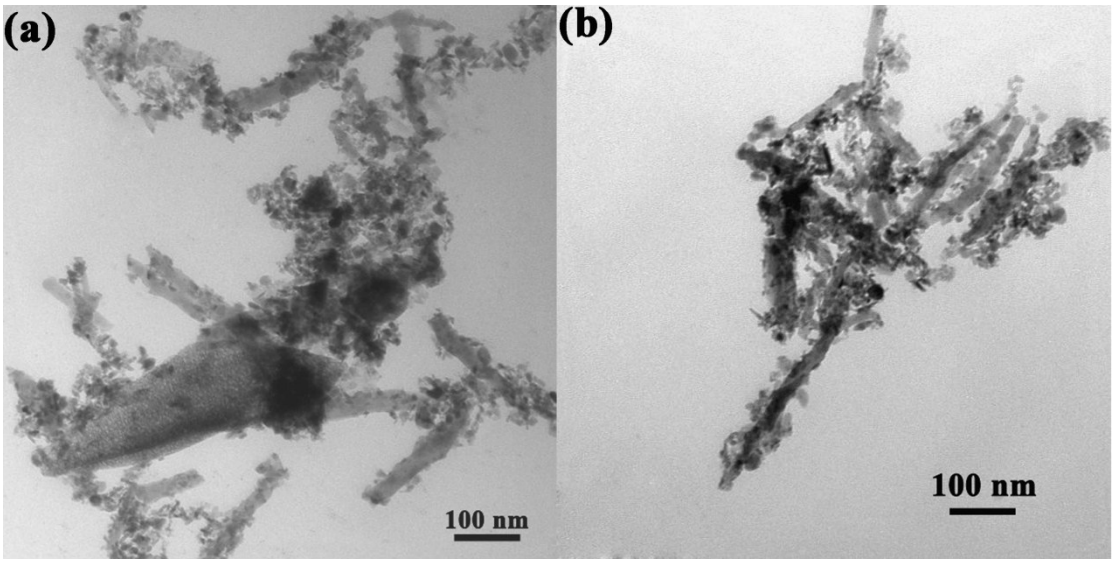

Fig. S7 TEM images of (a) APT/$CoAl_2O_4$-1-800 and (b) APT/$CoAl_2O_4$-3-800.

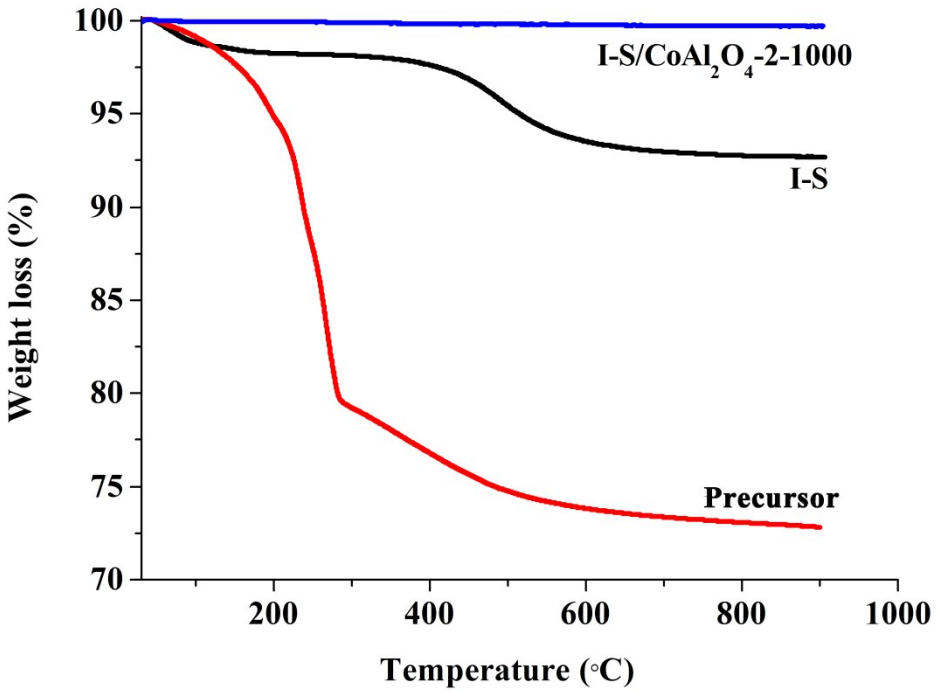

Fig. S8 TGA curves of the natural I-S, the precursor, and I-S/$CoAl_2O_4$-1000.

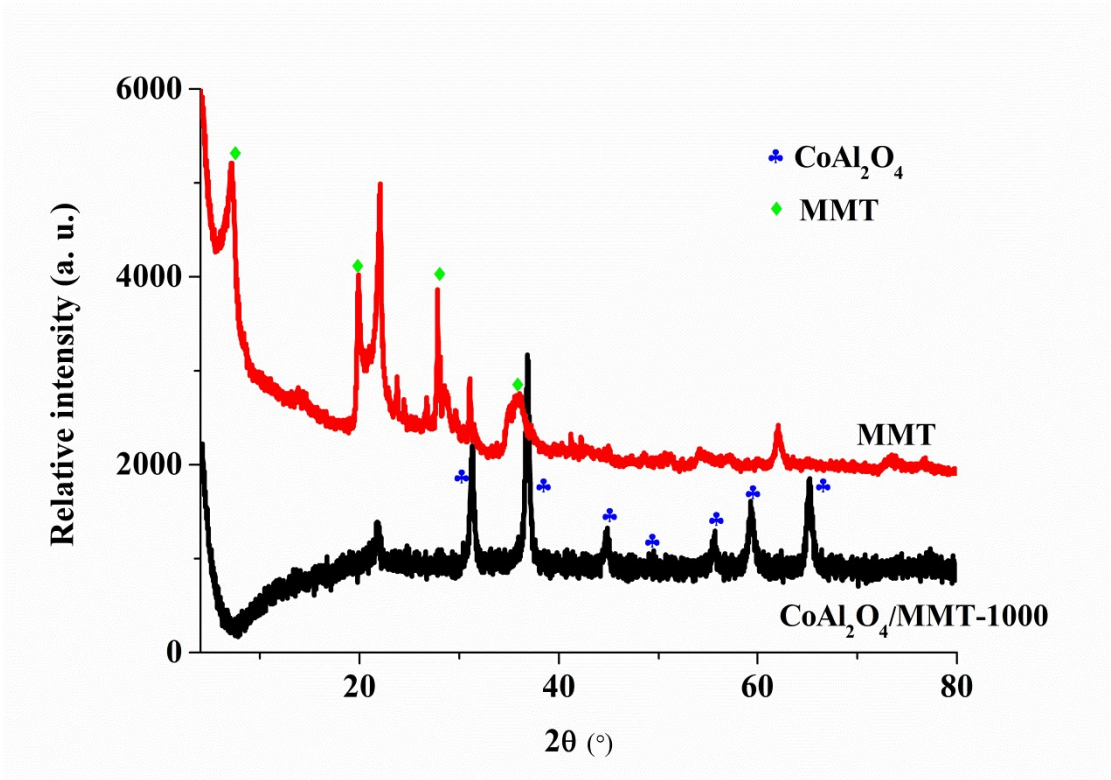

Fig. S9 XRD patterns of the natural MMT and MMT/$CoAl_2O_4$-1000.

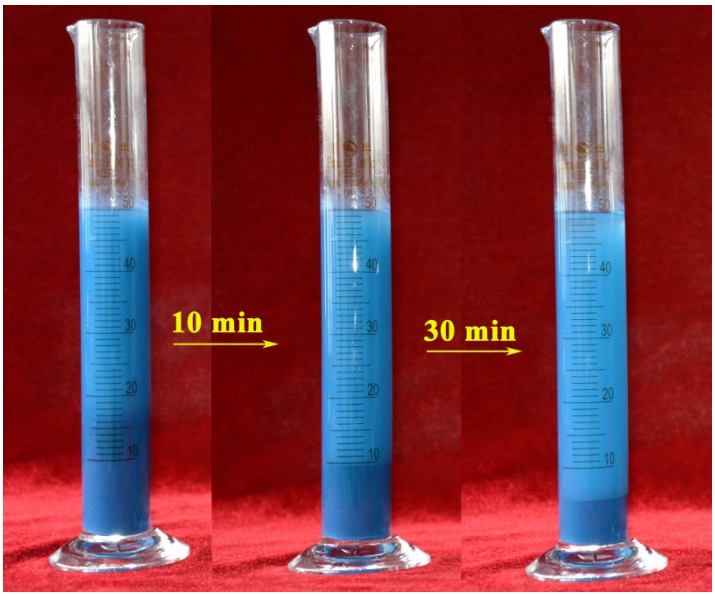

Fig. S10 Digital photographs of the suspension of $CoAl_2O_4$-1000

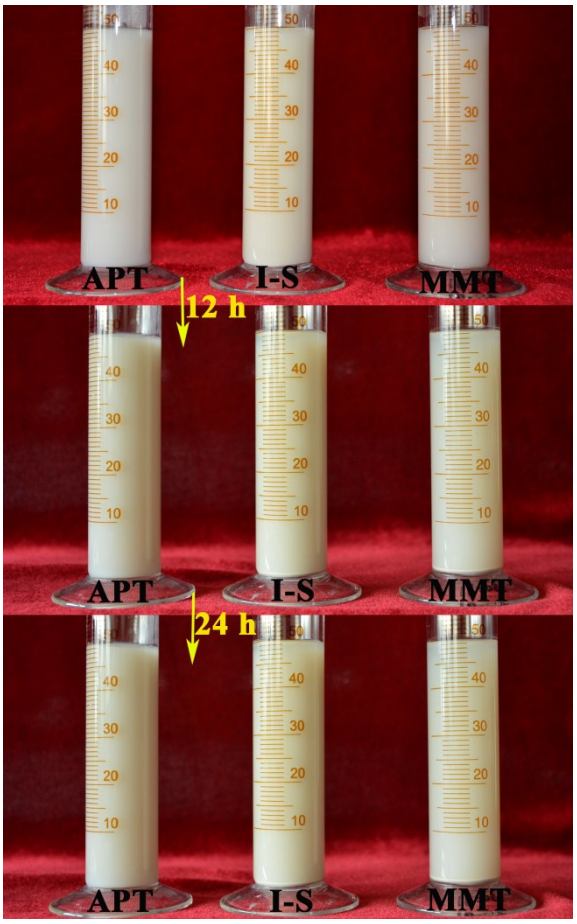

Fig. S11 Digital photographs of the suspension of the used three clays