

Supporting Information

Facile preparation of stable aqueous titania sols for fabrication of highly active TiO₂ photocatalyst films

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1. Experimental

a) Measurements of ¹³C NMR spectra

¹³C NMR spectrum was recorded on a JMN-ECA 500 spectrometer (JEOL). For ¹³C NMR spectrum measurements, CDCl₃ was used for an external referencing (77.23 ppm) and locking. For comparison, ¹³C NMR spectra of aqueous solutions of AcOH (0.40 mol/L), acac (0.40 mol/L), and 2-propanol (1.6 mol/L) were also measured.

b) Measurements of Raman spectra

The Raman spectra were recorded with laser Raman spectrometer (Jasco, NRS-7200); an argon ion laser at 532 nm was used.

c) Measurements of TG-DTA

Thermal analysis (TG-DTA) was conducted on dried powders on a TG-8120 (Rigaku). TG-DTA curves were recorded under air flow in the temperature range from 25 to 900°C.

2. Results

Table S1. ^{13}C NMR chemical shifts of AA-sols and authentic samples

Species	TiO_2 sol [ppm]	authentic sample [ppm]
AcOH	21.1 (CH_3) 177.3 (CO)	20.8 (CH_3) 177.1 (CO)
acac (keto-form)	30.9 (CH_3) 57.5 (CH_2) 208.9 (CO)	30.8 (CH_3) 57.5 (CH_2) 208.9 (CO)
acac (enol-form)	24.5 (CH_3) 101.4 (CH) 193.5 (CO)	24.4 (CH_3) 101.2 (CH) 193.4 (CO)
2-propanol	24.3 (CH_3) 64.7 (CH)	24.1 (CH_3) 64.7 (CH)
Ti-acac complex (depicted in Figure 5(b))	194.6 (CO) 187.8 (CO) 104.9 (CH) 26.7 (CH_3) 25.4 (CH_3)	—

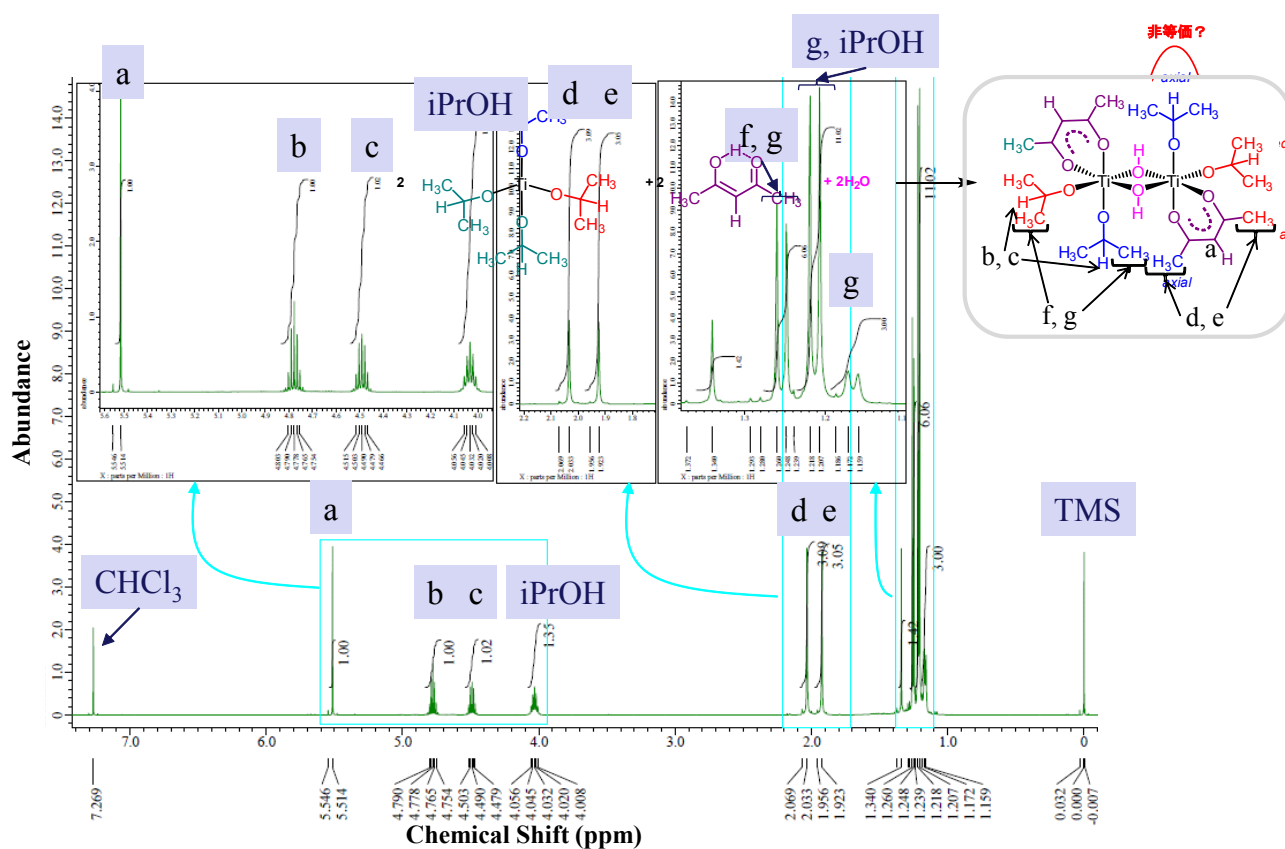


Fig. S1. ^1H NMR spectrum of a Ti-acac complex in CDCl_3 .

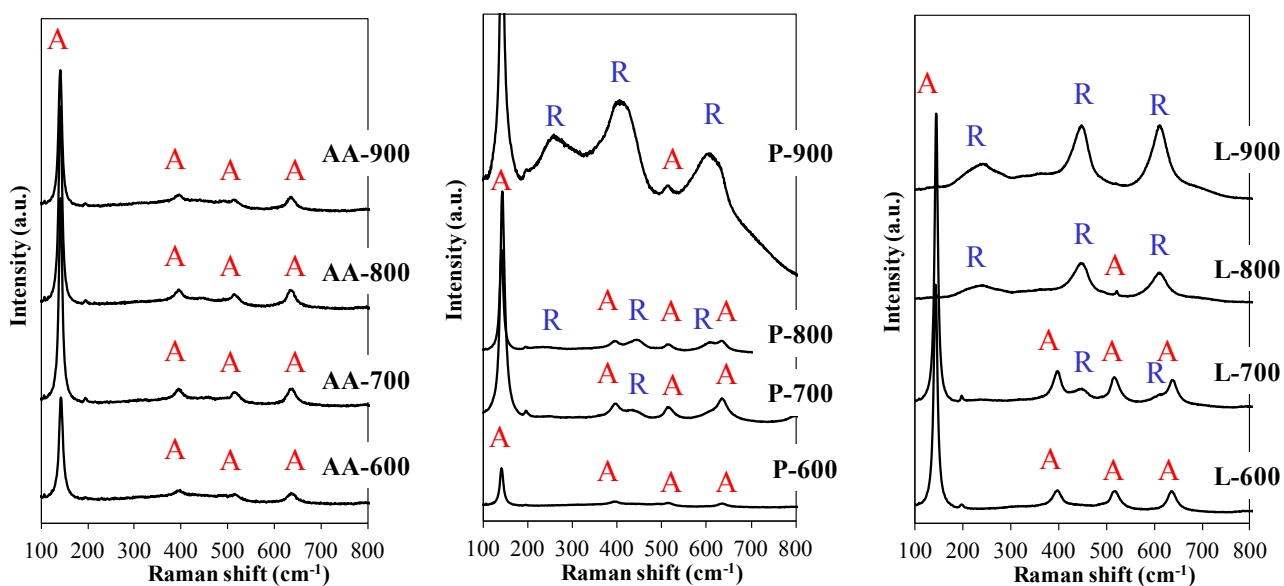


Fig. S2 Raman spectra of TiO₂ films.

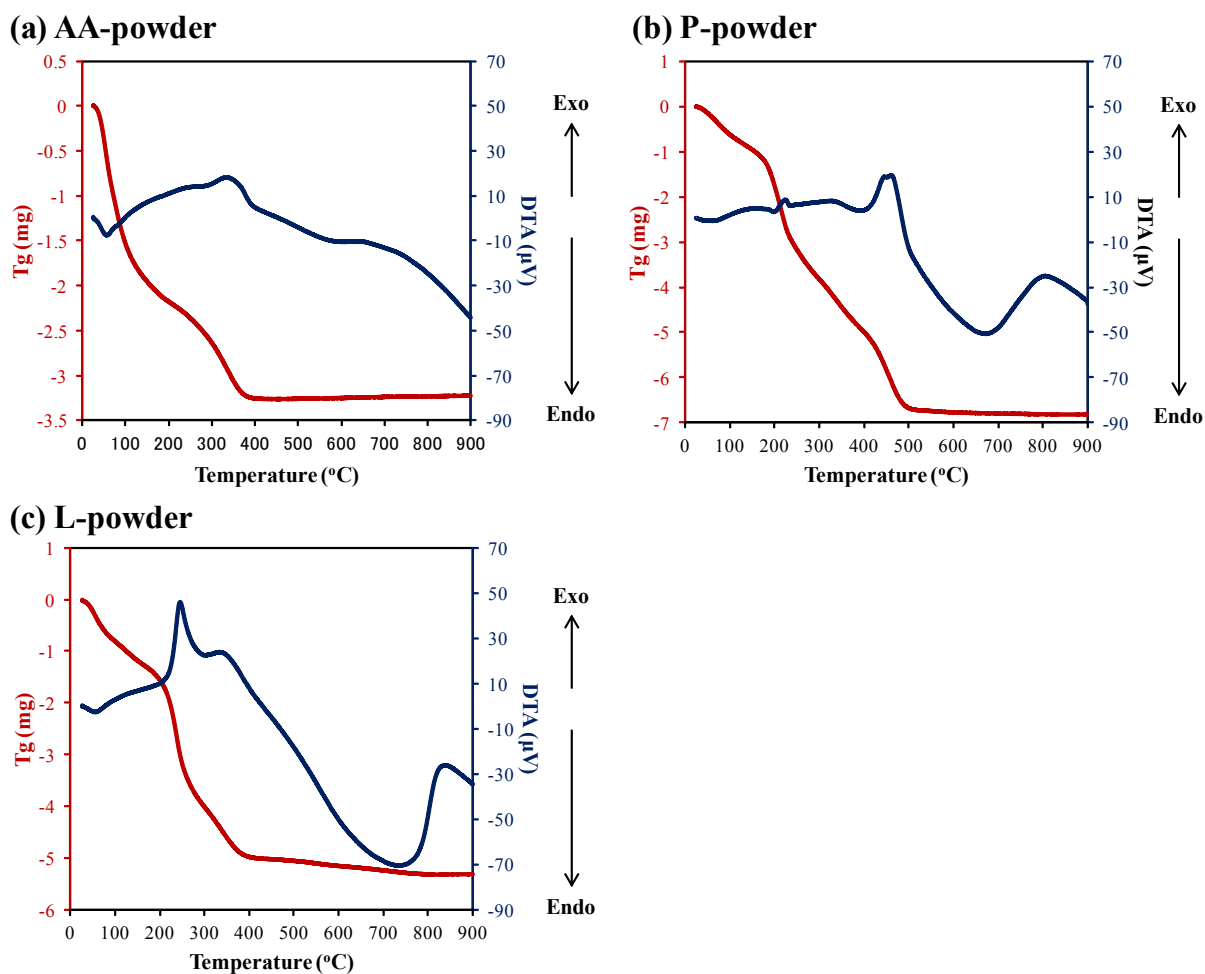


Figure S3. TG-DTA curves of dried powders prepared from sols.

Table S2. Crystalline sizes of TiO₂ films.

	AA-films	P-films	L-films
600°C	23.7	32.0	25.0
700°C	31.2	35.2	37.3
800°C	35.7	36.7	40.3
900°C	33.2	36.4	46.2

a) Calculated from the FWHM of the (101) peak by the Scherrer formula.

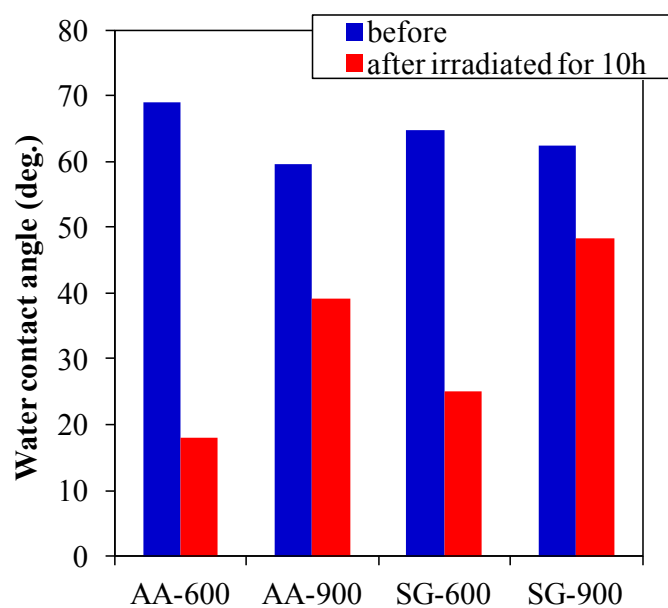


Figure S4. The CA value of AA- and SG-films calcined at 600 and 900°C before and after UV irradiation for 10 hours.