

Supporting Information

Layered Clay Aerogels by A Freeze-Drying Process for A Platinum-Supported Catalyst

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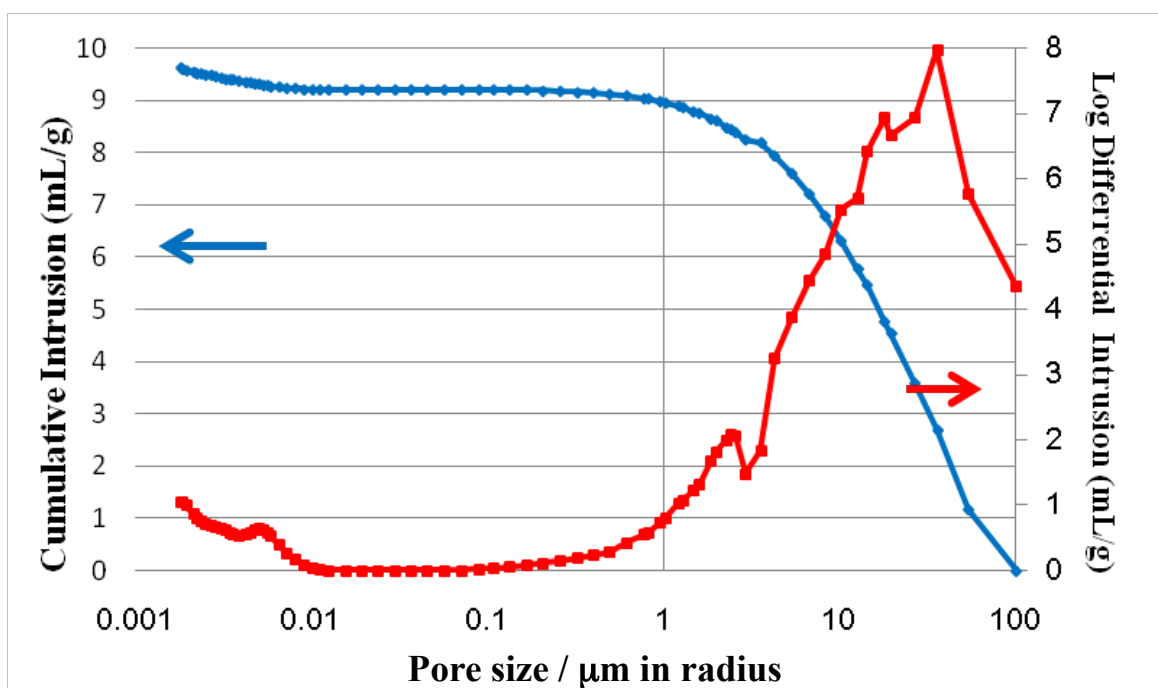


Figure S1. Pore size distribution from a mercury intrusion method regarding the aerogel obtained by freeze-drying thixotropic aqueous saponite gel (2 mass %) in liquid nitrogen.

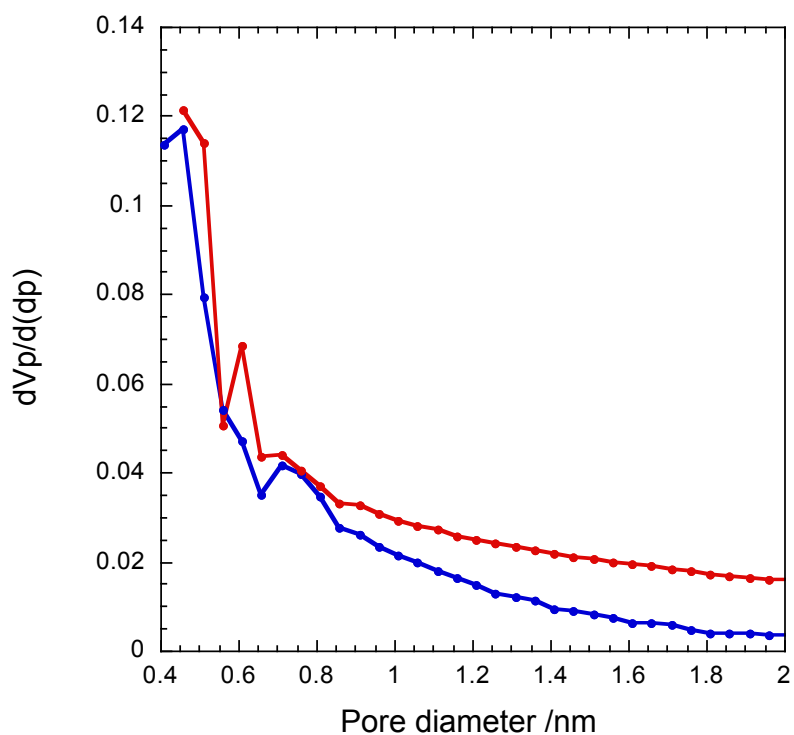


Figure S2. Pore size distributions by HK method from the N₂ adsorption isotherms shown in Figure 3 in the main text, regarding (blue) the aerogel obtained by freeze-drying thixotropic aqueous saponite gel (2 mass%), and (red) the saponite powder.

Excluded volume of platelet particles was calculated based on Onsager theory as following equation.

$$\text{Excluded volume} = \frac{1}{4}\pi D^2(L^2 + \frac{1}{2}(\pi + 3)DL + \frac{1}{4}\pi D^2) \quad (1)$$

From the diameter ($D = 20$ nm), and the thickness ($L = 1$ nm) of a silicate layer, the excluded volume of a silicate layer was calculated to be 6×10^{-24} [m³]. Considering that the ideal surface area of saponite is 700 m²/g (ref. 45), the mass of a silicate layer is 1×10^{-18} [g]. For example in the present system, the number of silicate layers in aqueous suspension (2 mass%) including 3 g saponite and 150 mL (1.5×10^{-4} [m³]) of water results in 3×10^{18} . The excluded volume of saponite dispersed in water (2 mass%) is $(6 \times 10^{-24}$ [m³]) \times (3×10^{18}) = 2×10^{-5} [m³].

As to the suspensions of 0.5 and 3 mass%, the extended volumes are calculated to be 5×10^{-6} and 3×10^{-5} [m³], respectively.