**S2. Hofmeister effects for the aggregation of NSC2**

To corroborate the resemblance between real and model systems, the aggregation kinetics of NSC2 have also been studied. As described in the text,NSC2 consist of ca. 4% quartz, 13% mica, 15% illite, 24% montmorillonite, 34% vermiculite and 10% albite. S13 Fig. shows that the time-dependent hydrodynamic diameters for the aggregation of NSC2 in NaNO3 and KNO3 solutions. The TAA rates and *CCC* values for the aggregation of NSC2 are calculated in the same way as those of NSC1. The *CCC* values for Na+ and K+ are equal to 47.4 and 61.9 mmol/L, respectively. Accordingly, Hofmeister effects have also been detected for the aggregation of NSC2, and its order based on the hydrodynamic diameters, TAA rates and CCC values should be K+ > Na+, consistent with the results of NSC1.

By means of eq. (2), the activation energies for the aggregation of NSC2 in Na+ and K+ solutions are obtained,

In Na+ solution:



In K+ solution:



At above *CCC*, the activation energies for the aggregation of NSC2 are nearly zero (i.e., Δ*E*(*c*0) ≈ 0 for *c*0 ≥ *CCC*) because of the TAA rates for *c*0 ≥ *CCC* are nearly constant, which quite resemble the scenarios of NSC1 and montmorillonite colloids. It can be seen from Fig. 4 that at any electrolyte concentration below *CCC*, the activation energies are apparently different in Na+ and K+ solutions and this clearly indicates the presence of Hofmeister effects for the aggregation of NSC2. The activation energies for Na+ are far larger than those for K+ (i.e., Na+ >> K+), in good agreement with the results of NSC1. Similarly, the activation energies that reflect Hofmeister effects can be determined at any given electrolyte concentration; e.g., at 20 mmol/L equal to 3.10*RT* and 0.26*RT* for Na+ and K+, respectively. These substantialize that the Hofmeister effects for the aggregation of NSCs in electrolyte solutions can be qualitatively and quantitatively described by use of activation energies; meanwhile, “huge gaps” between model and real systems can be filled by use of the descriptor − activation energy.