Electronic Supplementary Material (ESI) for Soft Matter.

Time Evolution of the Inner Structure of Antimony Phosphate Nanosheet Suspension Developing Structural Colouration

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Supporting Information

Figure 1S. Temporal change of the appearances of $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids with different concentrations.

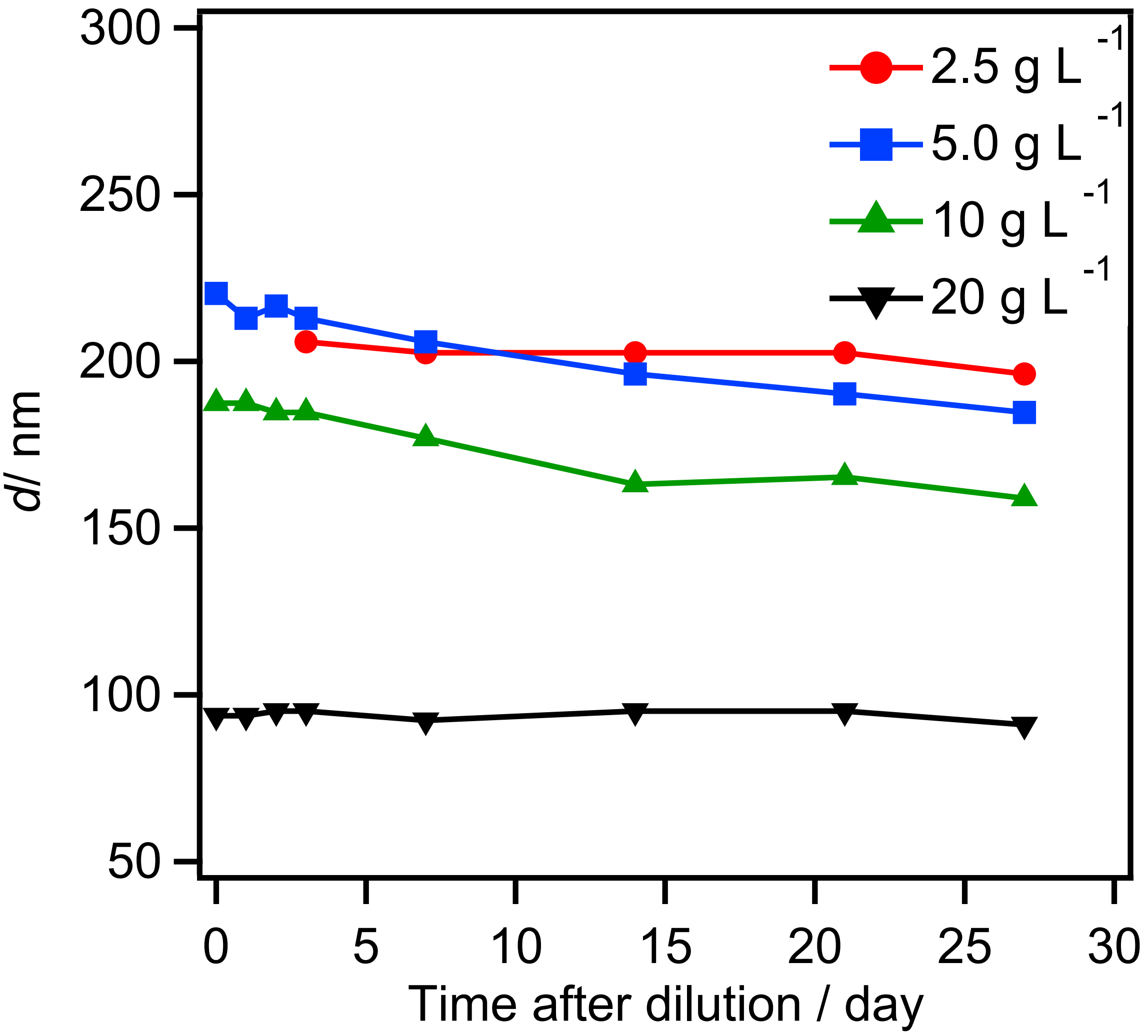


Figure 2S. Temporal change of basal spacing estimated by SAXS.

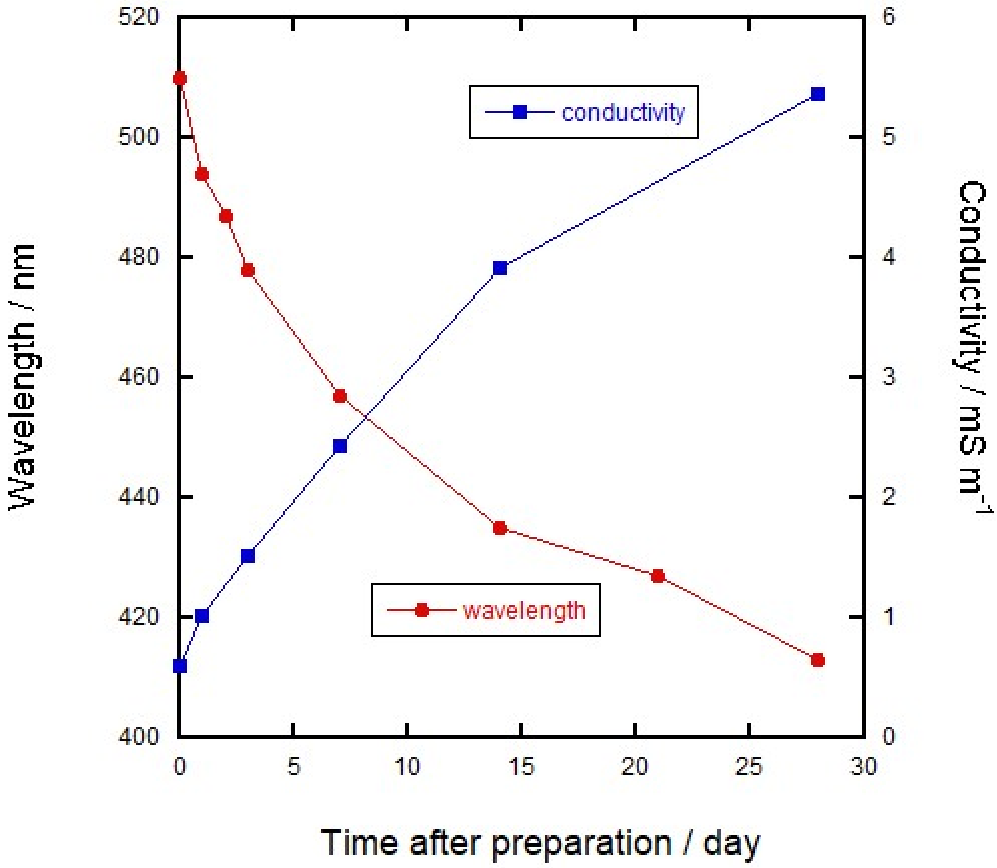


Figure 3S. Time evolution of peak wavelength and electric conductivity for $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids. Peak wavelength is from diffused reflective UV-Vis spectra for 10 gL^{-1} nanosheet colloid, and electric conductivity are measured for the diluted sample to 1/50.

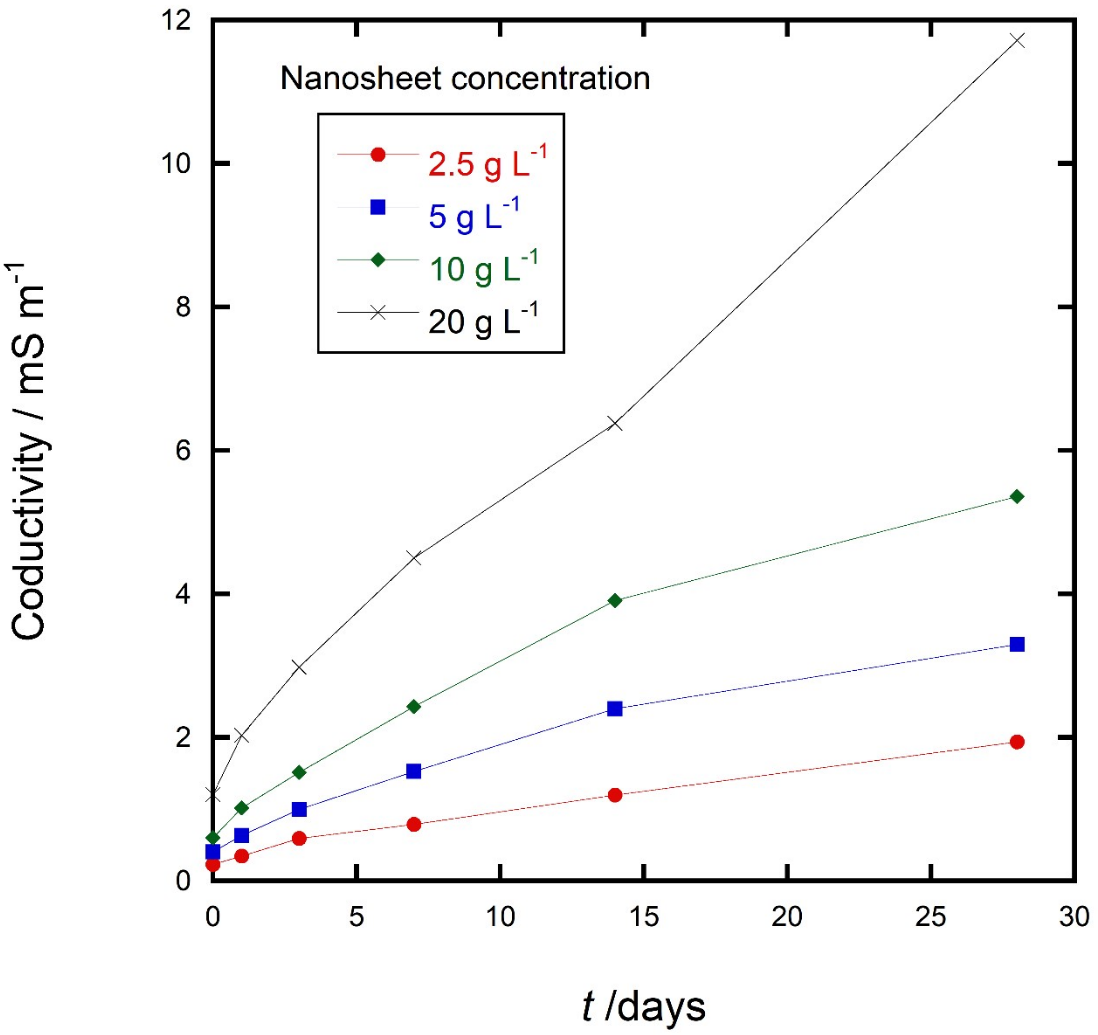


Figure 4S. Time evolution of electric conductivity for antimony phosphate nanosheet colloids. Electric $[Sb_3P_2O_{14}]^{3-}$ are measured for the diluted sample to 1/50 just after SAXS measurements. The lines are guide to the eyes.

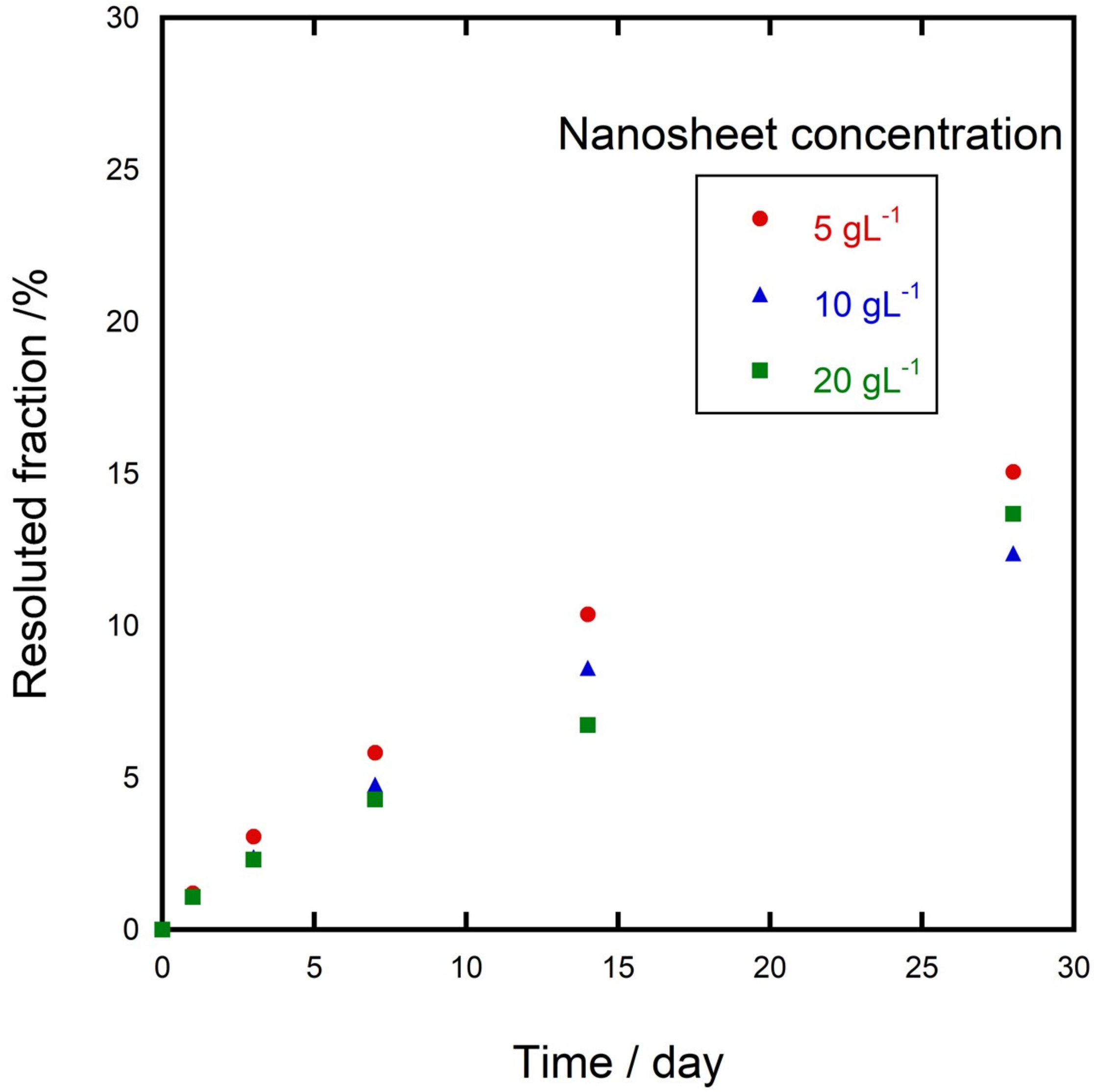


Figure 5S. Time-lapse of resoluted fraction of $[Sb_3P_2O_{14}]^{3-}$ nanosheets. The resoluted amounts are estimated based on the values of electric conductivities with some assumptions described in the main text.

NaCl 10^{-3} M 5 g L^{-1} 10 g L^{-1} 20 g L^{-1}

As prepared

7 days

14 days

21 days

28 days

NaCl 10^{-2} M 5 g L^{-1} 10 g L^{-1} 20 g L^{-1}

As prepared

7 days

Figure 6S. Temporal change of the appearances of $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids with different $[Sb_3P_2O_{14}]^{3-}$ nanosheet concentrations and 10^{-3}M NaCl concentrations.

Figure 7S. Temporal change of the appearances of $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids with different $[Sb_3P_2O_{14}]^{3-}$ nanosheet concentrations and 10^{-2}M NaCl concentrations.

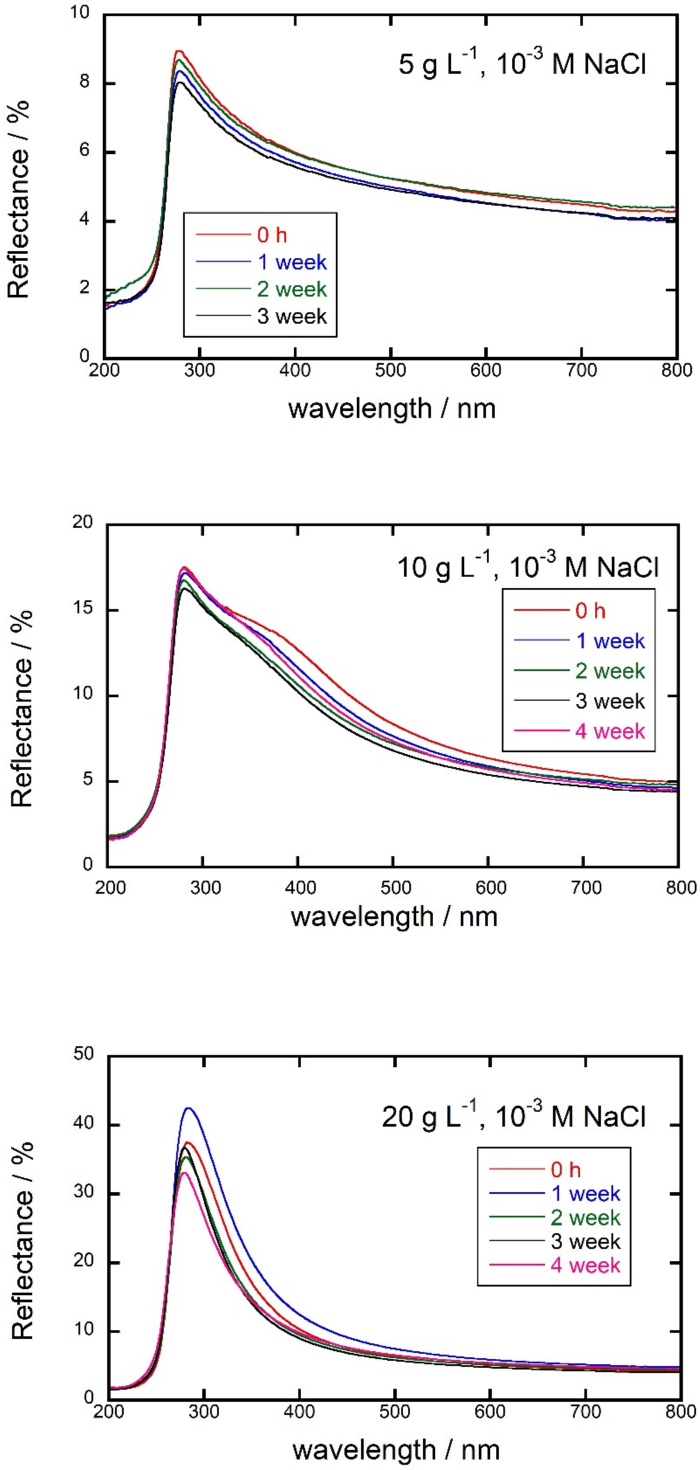
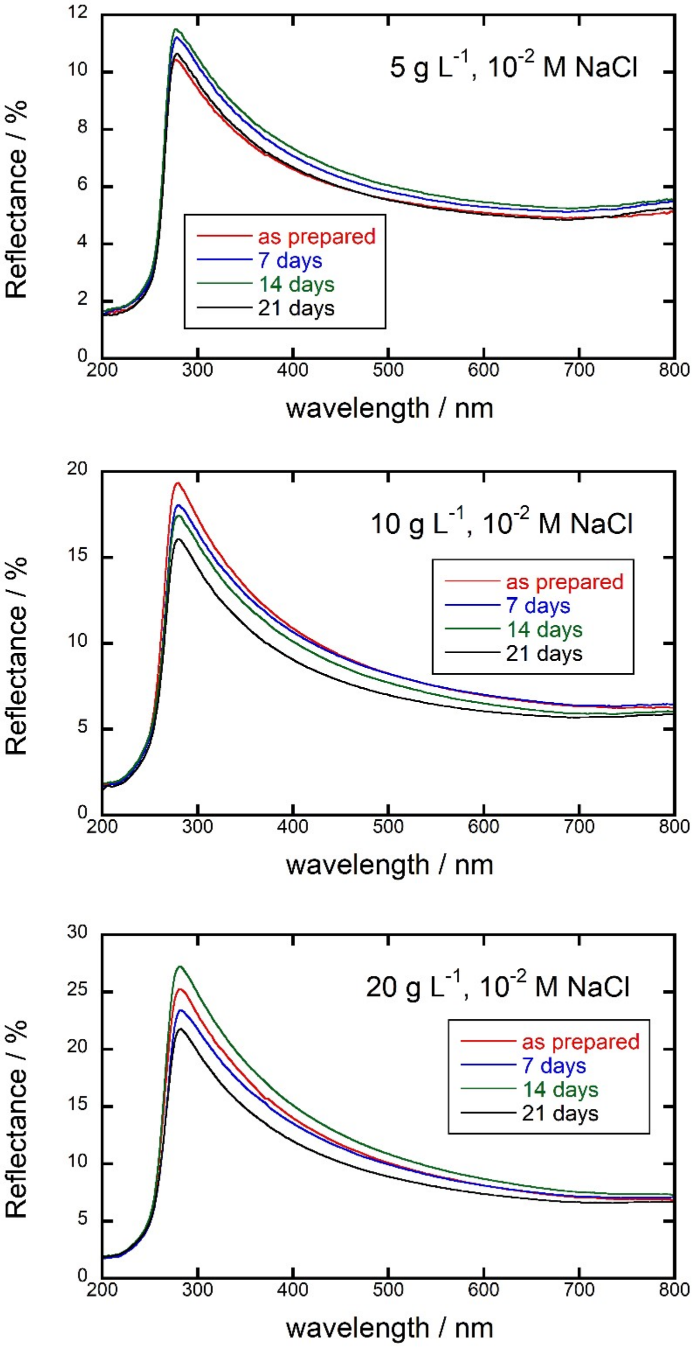


Figure 8S. Diffused reflective UV-Vis spectra of $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids with different $[Sb_3P_2O_{14}]^{3-}$ nanosheet concentrations in 10^{-3} M NaCl solution.



5 g L-1, 10-2 M NaCl
as prepared
7 days
14 days
21 days
Reflectance / %
wavelength / nm
0
2
4
6
8
10
12
200
300
400
500
600
700
800
10 g L-1, 10-2 M NaCl
as prepared
7 days
14 days
21 days
Reflectance / %
wavelength / nm
0
5
10
15
20
200
300
400
500
600
700
800
20 g L-1, 10-2 M NaCl
as prepared
7 days
14 days
21 days
Reflectance / %
wavelength / nm
0
5
10
15
20
25
30
200
300
400
500
600
700
800

Figure 9S. Diffused reflective UV-Vis spectra of $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids with different $[Sb_3P_2O_{14}]^{3-}$ nanosheet concentrations in 10^{-2} M NaCl solution.

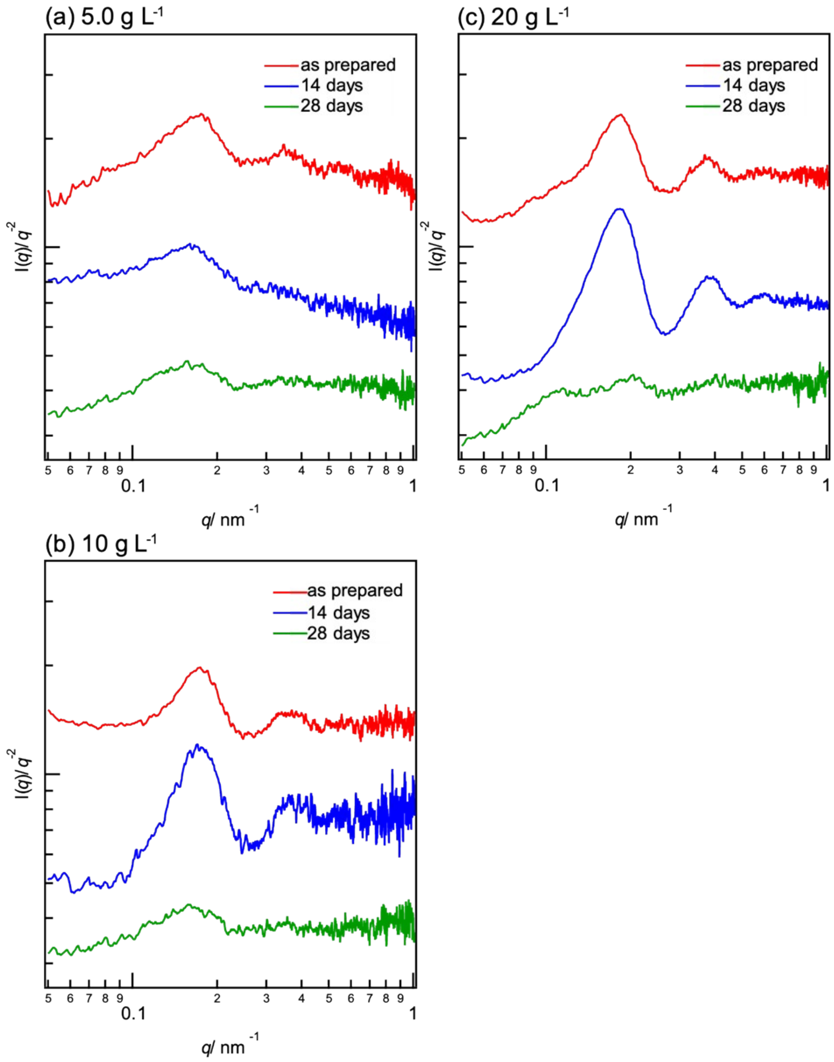


Figure 10S. Time course of SAXS profiles of $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids with 10^{-2} mol L^{-1} NaCl at constant nanosheet concentrations (a) 5 g L^{-1}, (b) 10 g L^{-1}, (c) 20 g L^{-1}.

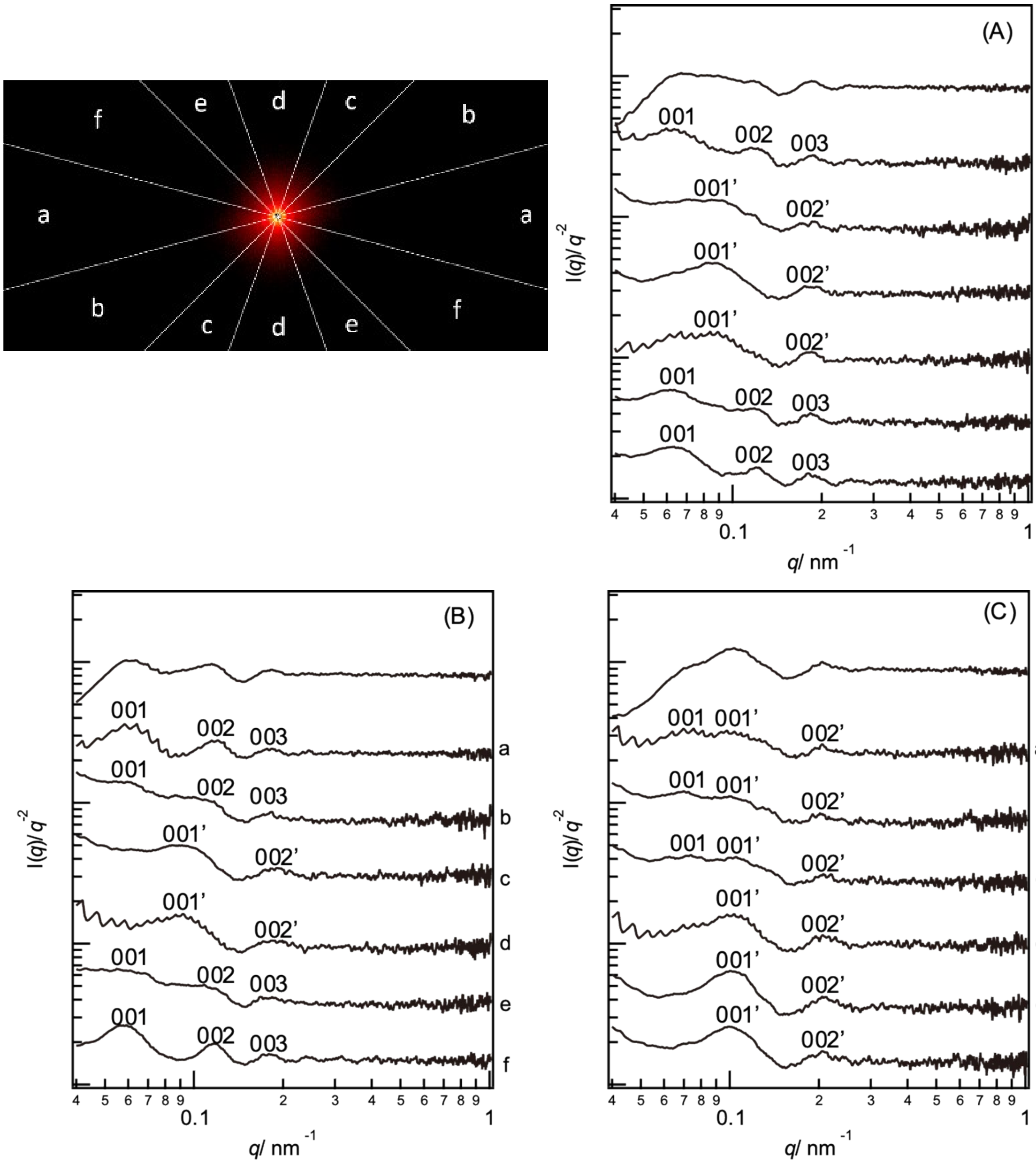


Figure 11S. Angular divided SAXS profiles for 20 g L^{-1} $[Sb_3P_2O_{14}]^{3-}$ colloids with 10^{-3} mol L^{-1} NaCl concentrations at different time periods (A) as prepared, (B) 14 days, and (C) 28 days accumulated in the specific section assigned in the 2D scattering pattern (*a~f*).

2D scattering pattern is divided into 12 parts with 30 degree in central angle. The divided parts are pared by diagonal angle position and labelled from *a* to *f* . The SAXS profiles at the top for each graph is torus integrated profile, which is commonly-presented form and also presented in Fig. 9S. The other six profiles under torus integrated profile is the profiles extracted from each area labelled from *a-f* in 2D scattering pattern.

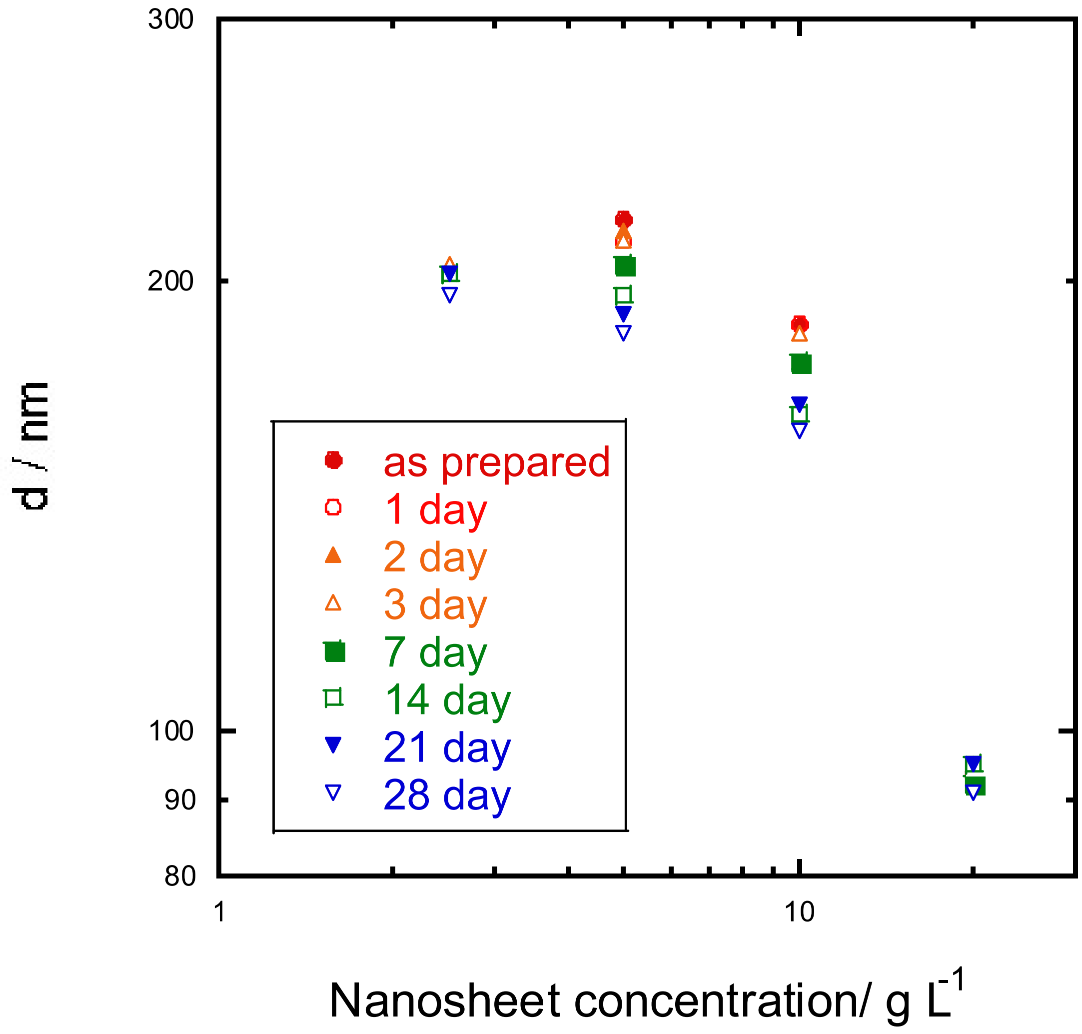


Figure 12S. Time evolution of basal spacing variations with $[Sb_3P_2O_{14}]^{3-}$ nanosheet concentration in logarithmic values.

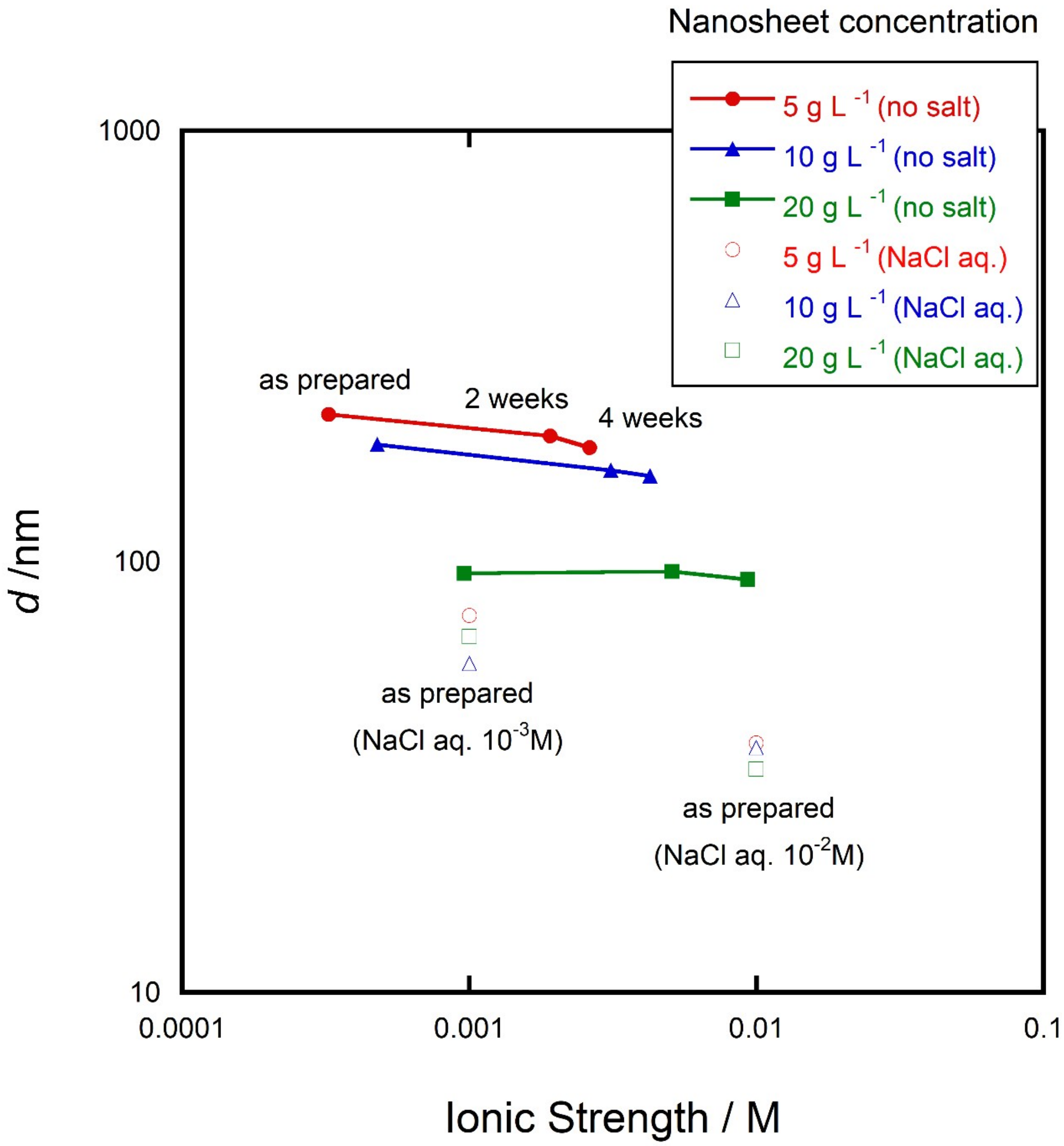


Figure 13S. Basal spacings plotted against ionic strength. The values of ionic strength in aqueous system is estimated from the electric conductivities of 1/50 diluted samples with some assumptions described in the main text.

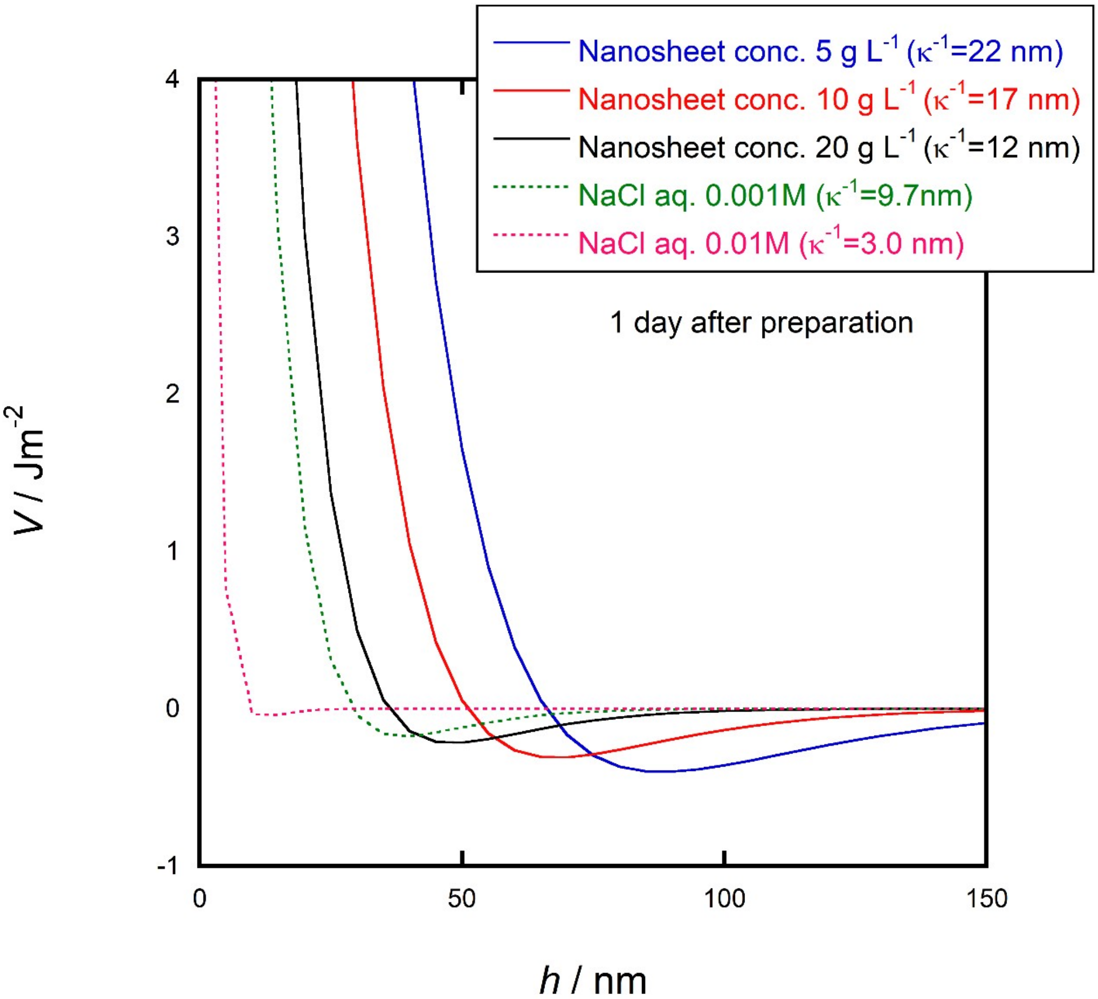


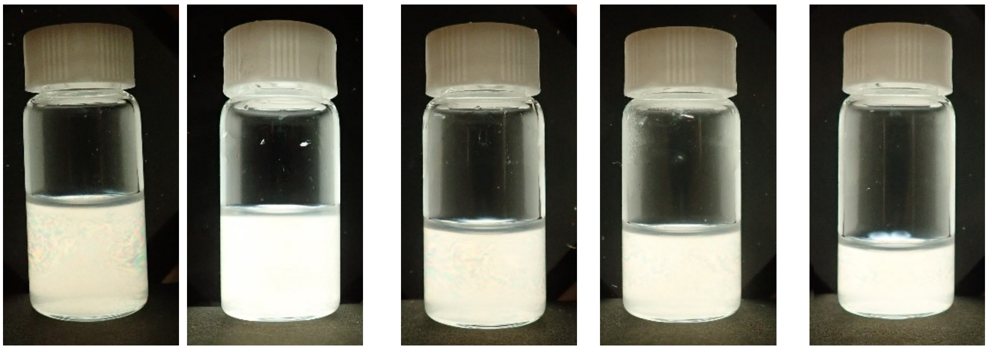
Figure 14S. Simulated potential curves based on Ise-Sogami theory for $[Sb_3P_2O_{14}]^{3-}$ nanosheet systems at various Debye lengths (κ^{-1}). The values of estimated ionic strength from electric conductivity measurements are introduced in the simulation. The simulated distances at minimum potential is much shorter than the basal spacings experimentally obtained.

Table 1S Sample appearances between the crossed polarizers.

Time	As prepared	7 day	14 day	21 day	28 day
5 g L^{-1} $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids Without salt					
5 g L^{-1} $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids 10^{-3}M NaCl aq.					
5 g L^{-1} $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids 10^{-2}M NaCl aq.					
10 g L^{-1} $[Sb_3P_2O_{14}]^{3-}$ nanosheet colloids Without salt					

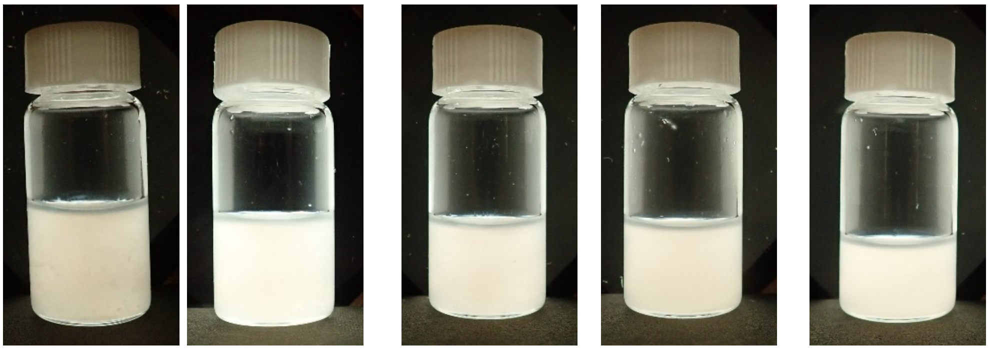
10 g L^{-1}
$[Sb_3P_2O_{14}]^{3-}$
nanosheet
colloids

10^{-3}M
NaCl aq.



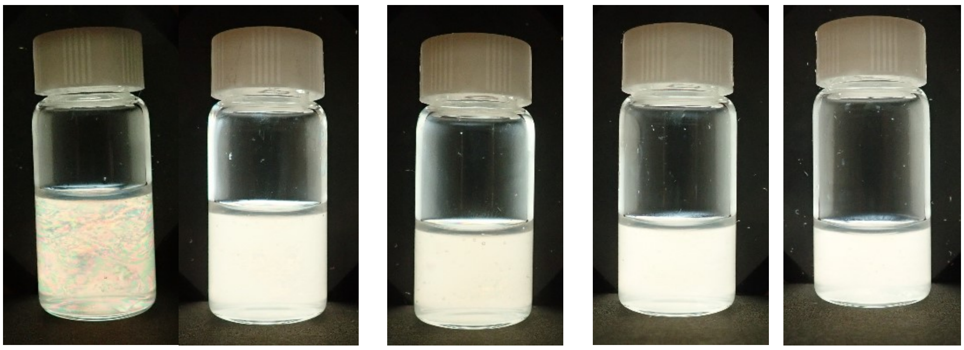
10 g L^{-1}
$[Sb_3P_2O_{14}]^{3-}$
nanosheet
colloids

10^{-2}M
NaCl aq.



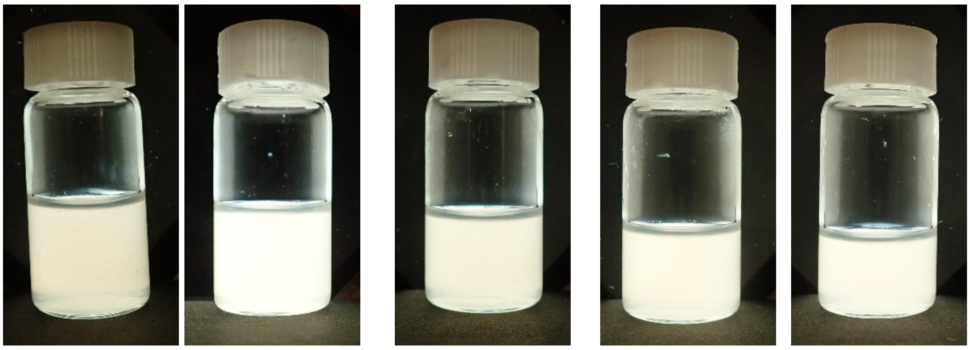
20 g L^{-1}
$[Sb_3P_2O_{14}]^{3-}$
nanosheet
colloids

Without salt



20 g L^{-1}
$[Sb_3P_2O_{14}]^{3-}$
nanosheet
colloids

10^{-3}M
NaCl aq.



20 g L^{-1}
$[Sb_3P_2O_{14}]^{3-}$
nanosheet
colloids

10^{-2}M
NaCl aq.