

Concentration of thixotropy

Hyogo Prefecture KOBE High School Sougourigaku course
Nozomi Sakai Chihiro Nagate Chiko Nishikawa Mai Miyake

<Purpose>

- 1, Search for the correct ratio of $\text{Al}(\text{OH})_3$ to H_2O so that $\text{Al}(\text{OH})_3$ colloid shows thixotropic nature.
 - 2, When the colloid shows thixotropic nature. Compare the ratio of the dispersion medium to the dispersion of plural colloid.
- And, check whether there is a common point or not.

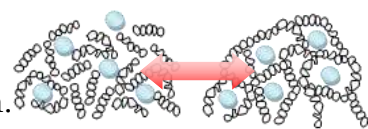
<Result>

We found that $\text{Fe}(\text{OH})_3$ colloid shows thixotropic nature most conspicuously when concentration of $\text{Fe}(\text{OH})_3$ in H_2O solution is about 19%. We found that $\text{Al}(\text{OH})_3$ colloid shows concentration dependence.

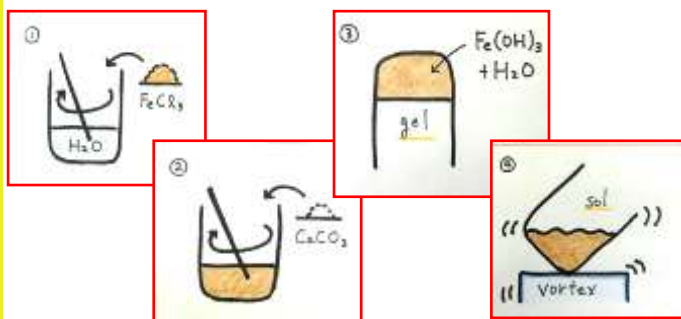
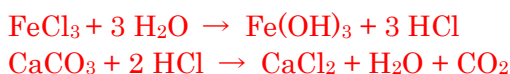
We couldn't have found any common points among plural colloid.

<Thixotropic nature>

Thixotropy is the nature which some fluids have. If the fluid comes to rest, it becomes gel. If the fluid is mixed, it becomes sol. Particles of a colloid form a network structure, Thixotropy happen.



<Iron hydroxide colloid>

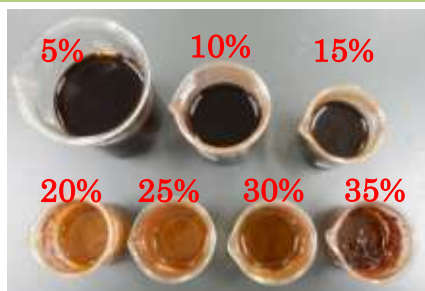


Result ↓ (Table 1)

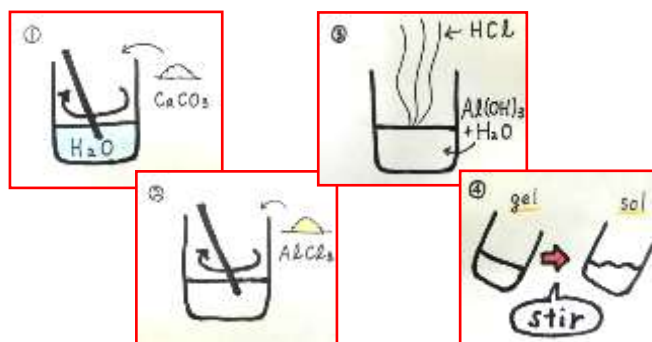
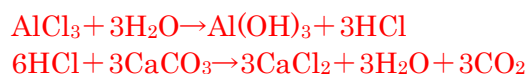
| Concentration | Observations | Thixotropic nature | Concentration of colloid |
|---------------|---------------------------------|--------------------|--------------------------|
| 40% | Overflowed. | — | — |
| 35% | Dark brown. Gel. | △ | 28% |
| 30% | Brown. Gel. | ○ | 23% |
| 25% | Light brown. Gel. | ○ | 19% |
| 20% | Light brown. Look like pudding. | △ | 15% |
| 15% | Light brown. Sol. | × | 11% |
| 10% | Dark brown. Sol. | × | 7% |
| 5% | Dark brown. Sol. | × | 3% |

- : good
- △ : middle
- ×

(→this picture is observations of the experiments. From 5 to 35% starting from the upper left.)



<Aluminum hydroxide colloid>



Measured value ↓ (Table 2)

| | 20% | 15% | 10% | 5% |
|----------------------|---------|---------|---------|----------|
| H_2O | 31.99 g | 45.28 g | 71.99 g | 151.98 g |
| CaCO_3 | 9.06 g | 9.02 g | 9.00 g | 9.01 g |
| AlCl_3 | 8.06 g | 7.99 g | 8.03 g | 8.06 g |

Result ↓ (Table 3)

| Concentration | Observations | Thixotropic nature | Concentration of colloid |
|---------------|--------------|--------------------|--------------------------|
| 20% | White. Gel. | ○ | 13% |
| 15% | White. Gel. | ○ | 10% |
| 10% | White. Sol. | × | 6% |
| 5% | White. Sol. | × | 3% |



(←From 5 to 20% starting from the left.)

<From now on>

We found that a colloid of $\text{Al}(\text{OH})_3$ showed thixotropy depending on concentration. From now on, we will make a colloid of $\text{Al}(\text{OH})_3$ by changing each concentration for which a colloid of $\text{Al}(\text{OH})_3$ shows thixotropy. Future research is ①To change the concentration ②To get accuracy of the result of $\text{Fe}(\text{OH})_3$ experiment. We want to solve these problems.