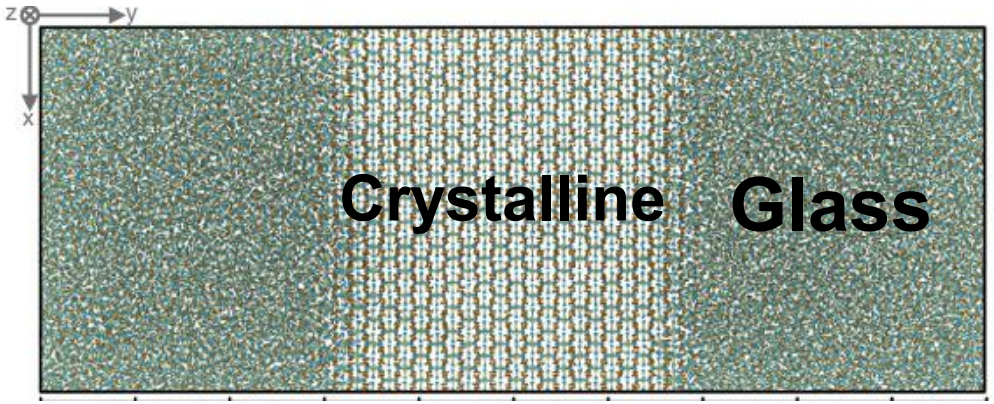
SI Result 1. Lateral Displacement Distribution

Li_3PS_4



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Disorder-induced enhancement of lithium-ion transport in solid-state electrolytes

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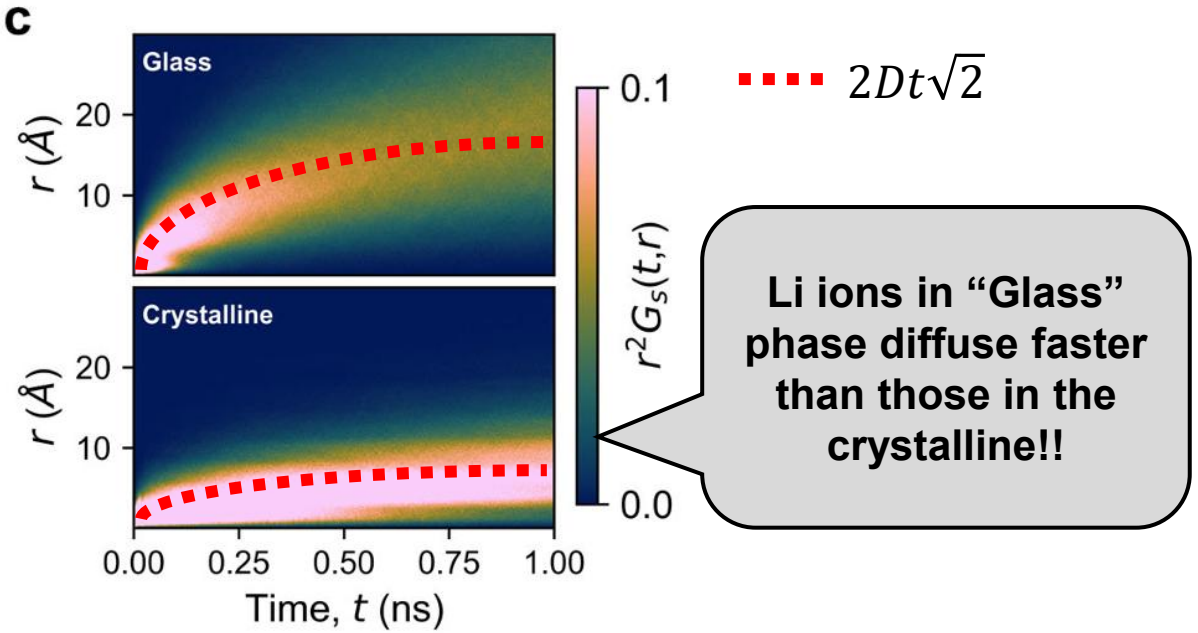
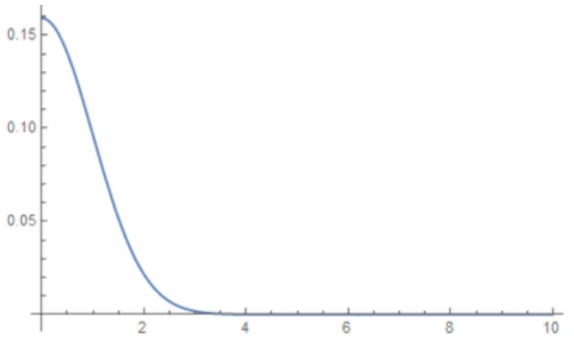
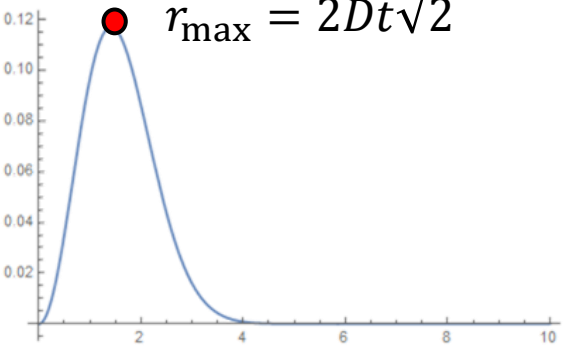


$$P(\boldsymbol{r},t) = (4\pi Dt)^{-3/2} e^{-r^2/4Dt}$$



$$r^2P(\boldsymbol{r},t)$$

$$r_{\max} = 2Dt\sqrt{2}$$



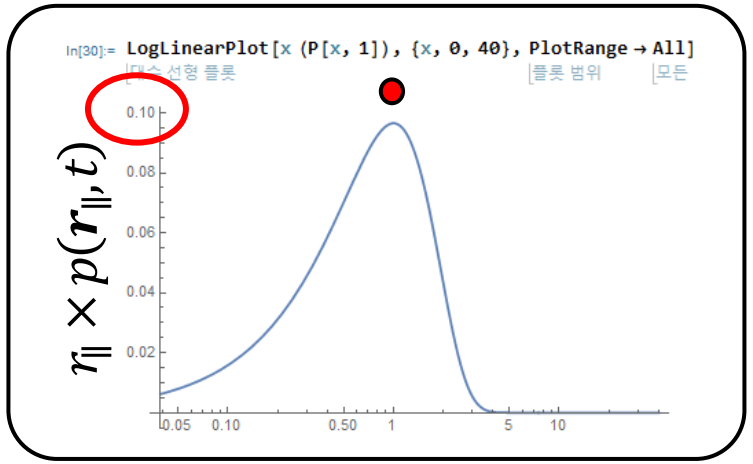
SI Result 1. Lateral Displacement Distribution

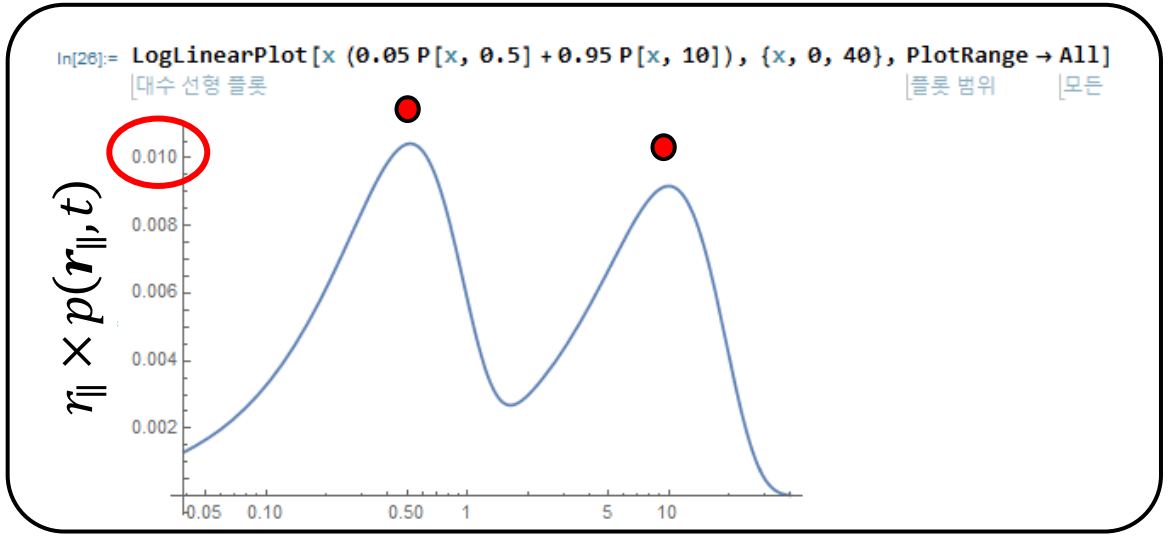
$$p(\boldsymbol{r}_{\parallel}, t) \cong \sum_n f_n p_{\mathcal{N}}\left(\boldsymbol{r}_{\parallel}, t | D_{\parallel}^{(n)}\right) \qquad \sum_n f_n = 1$$

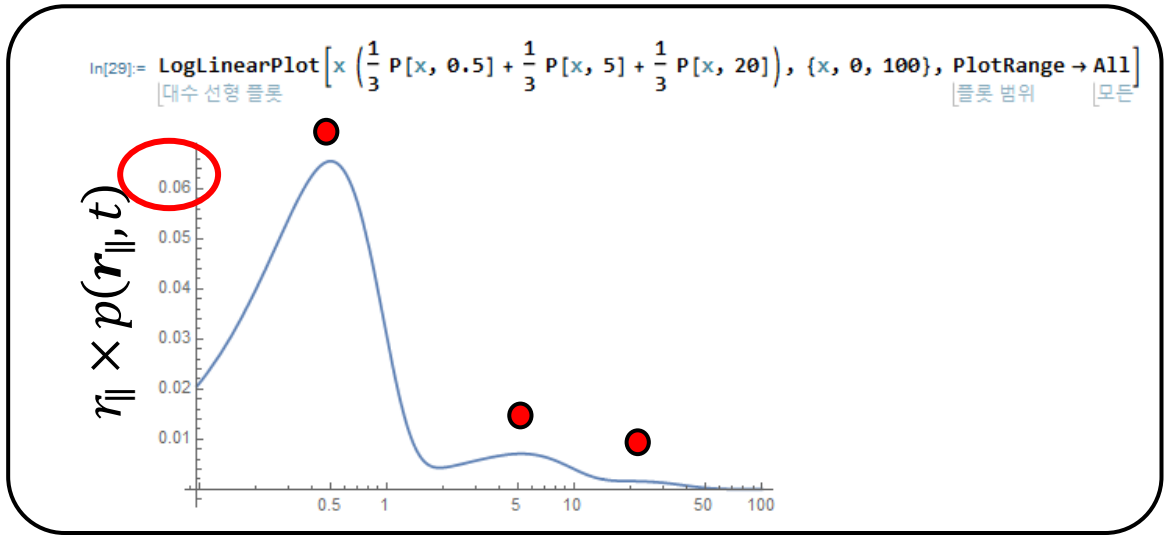
$$p_{\mathcal{N}}(\boldsymbol{r}_{\parallel}, t | D_{\parallel}) \equiv (4\pi D_{\parallel} t)^{-1} e^{-r_{\parallel}^2 / 4 D_{\parallel} t}$$

$$r_{\parallel} \times p_{\mathcal{N}}(\boldsymbol{r}_{\parallel}, t | D_{\parallel}) \rightarrow \text{ maximum at } r_{\parallel} = \sigma = \sqrt{2 D_{\parallel} t}$$

```
In[2]:= P[x_, σ_] := (2 π σ²)^-1 Exp[-x² / (2 σ²)]
                                  |지수 함수
```





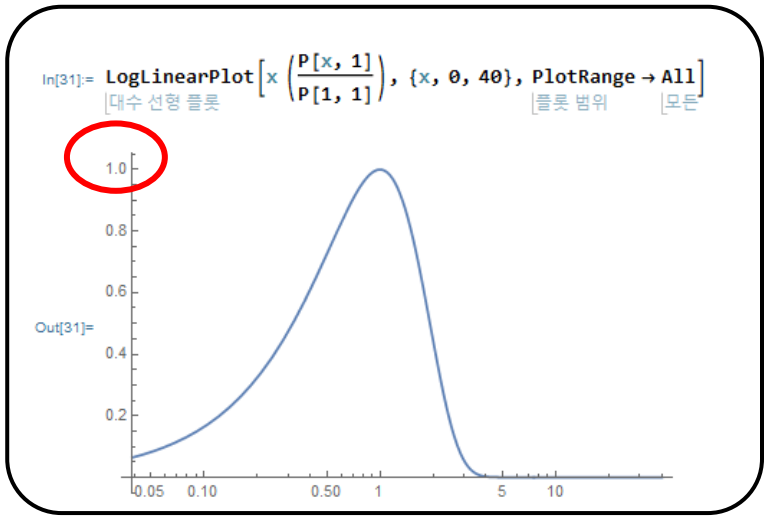


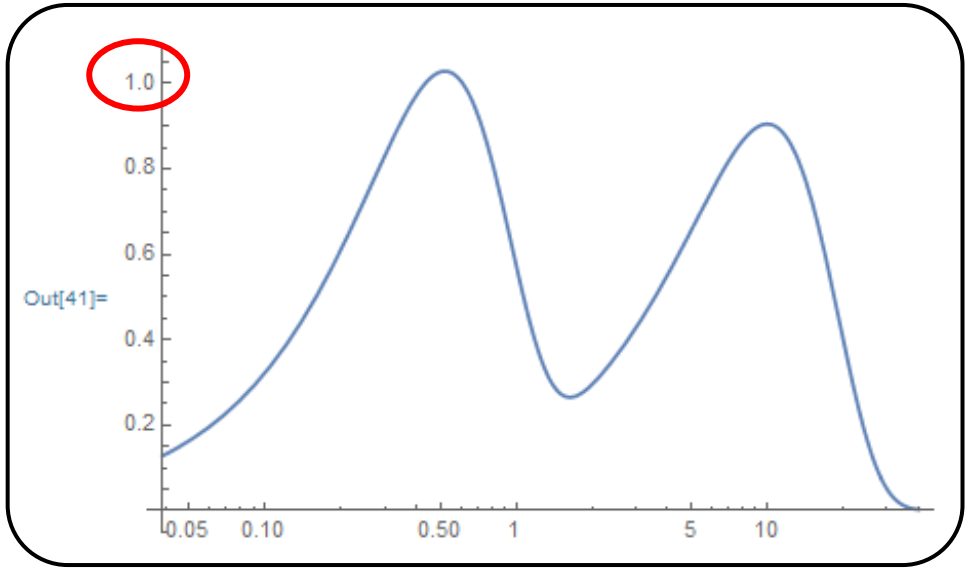
SI Result 1. Lateral Displacement Distribution

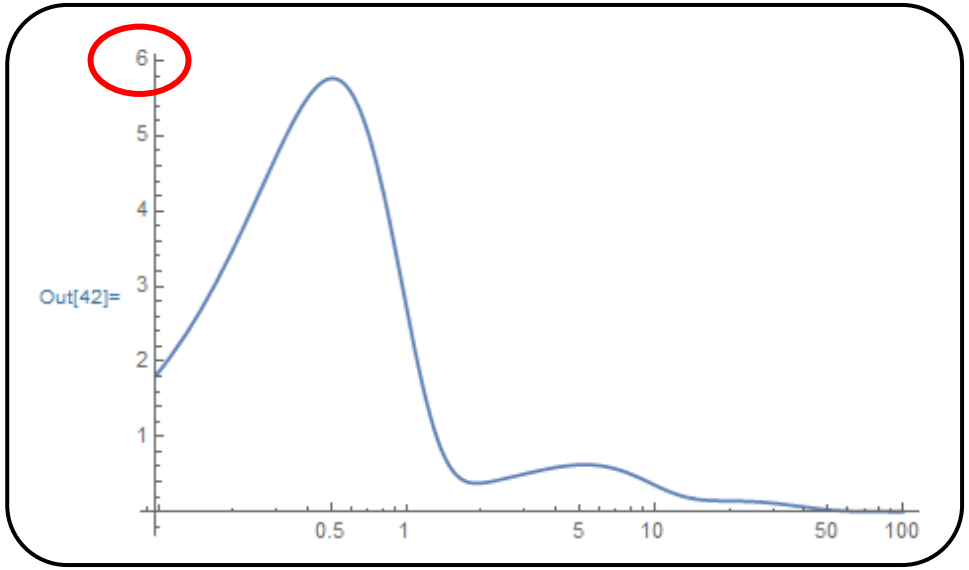
$$p(\boldsymbol{r}_{\parallel},t) \cong \sum_n f_n p_{\mathcal{N}}\left(\boldsymbol{r}_{\parallel},t|D_{\parallel}^{(n)}\right) \qquad \sum_n f_n = 1$$

$$p_{\mathcal{N}}(\boldsymbol{r}_{\parallel},t|D_{\parallel}) \equiv (4\pi D_{\parallel} t)^{-1} e^{-r_{\parallel}^2/4D_{\parallel}t}$$

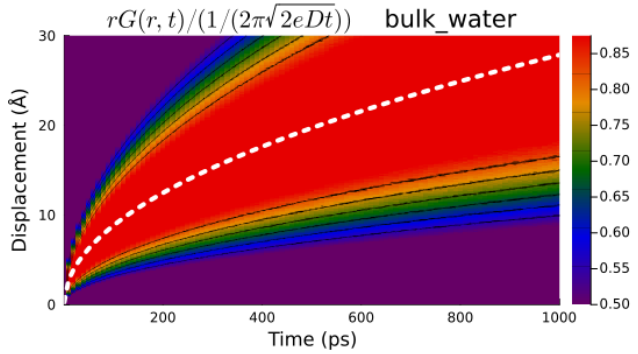
$$f(\boldsymbol{r}_{\parallel},t) \equiv \frac{r_{\parallel} p(\boldsymbol{r}_{\parallel},t)}{\sigma\, p_{\mathcal{N}}(\sigma,t|\sigma)}\Big|_{\sigma=\sqrt{2\langle D_{\parallel}\rangle t}}$$

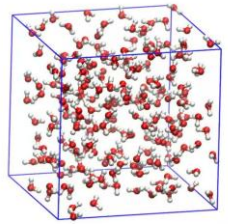


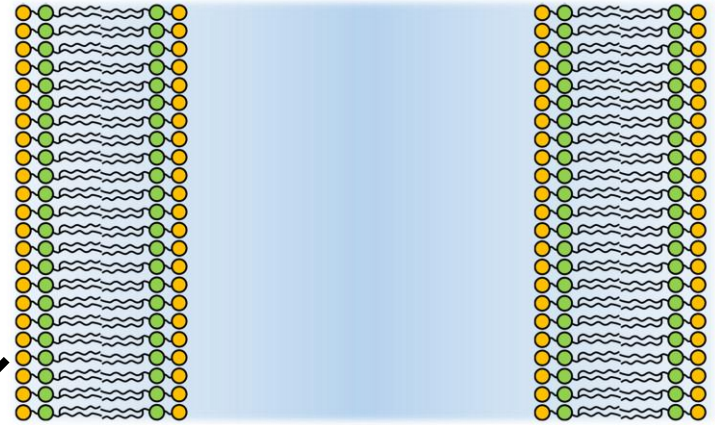


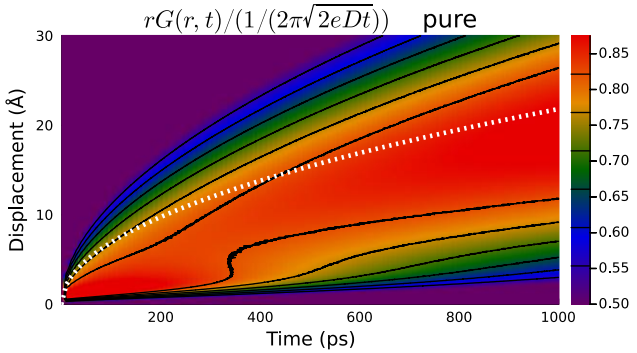


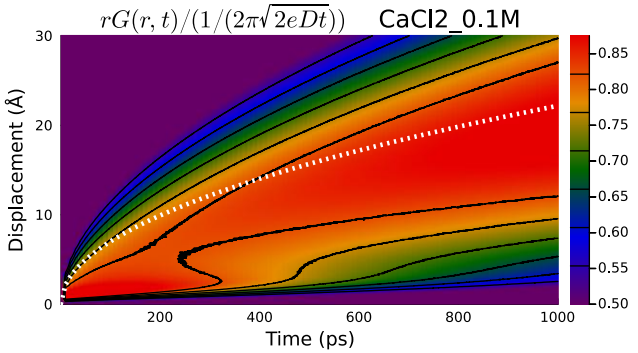
SI Result 1. Lateral Displacement Distribution

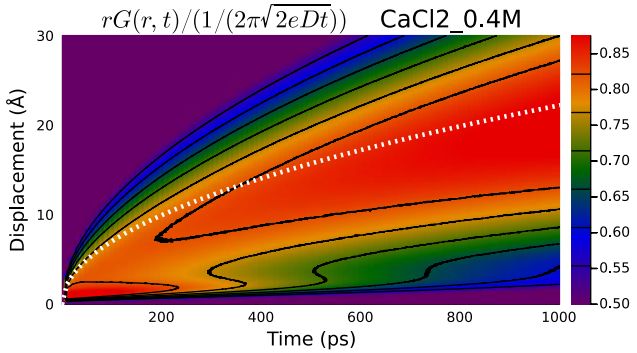


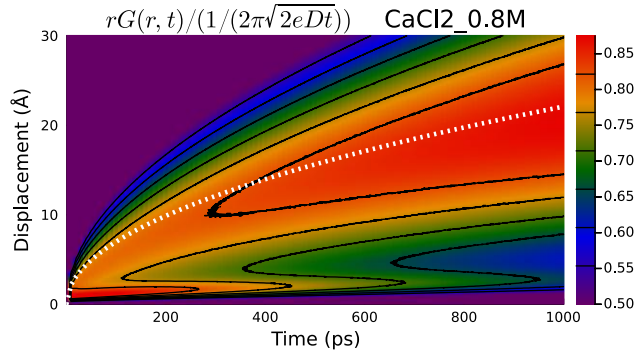


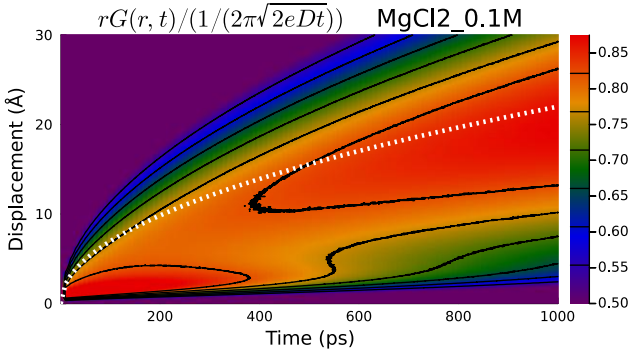


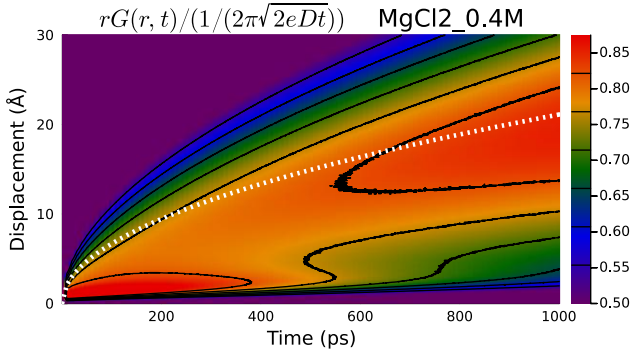


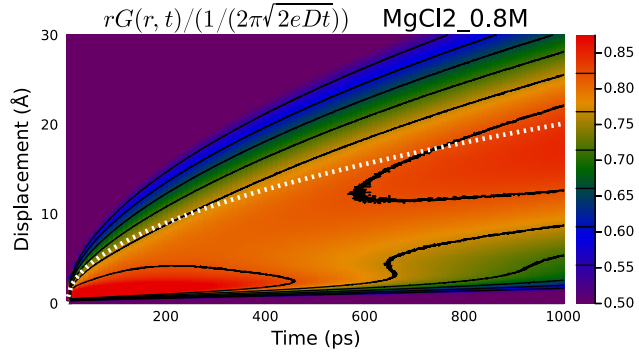


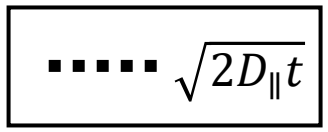






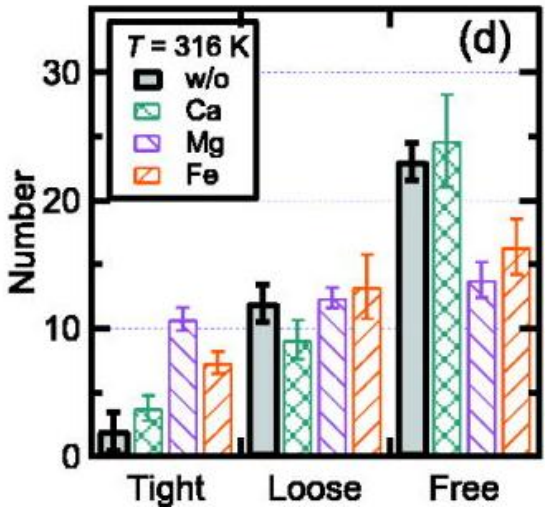




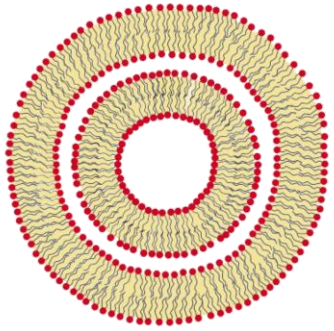


SI Result 2. Experimental result

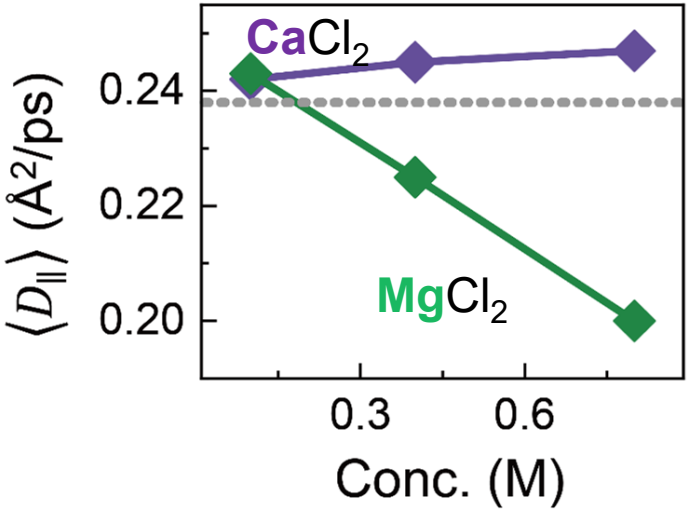
Fig. 3

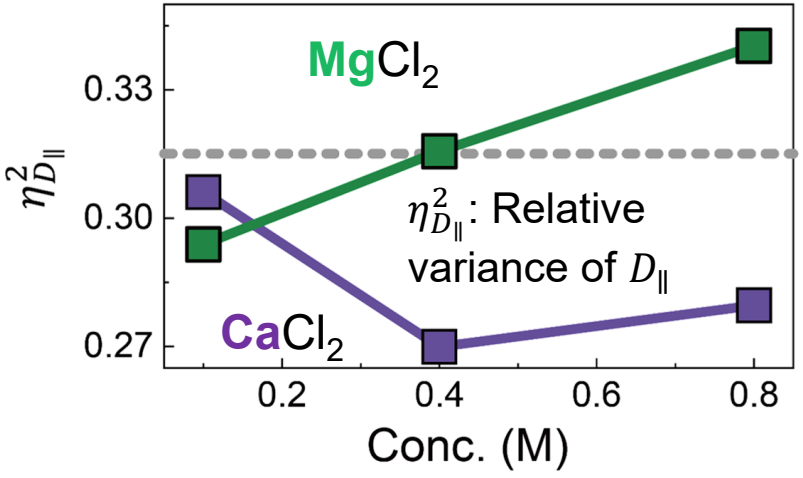


[Experiment]
DMPC
37 H_2O/lipid molecule.
0.45 M conc.



Multilamellar lipid vesicle





Quasi-elastic neutron scattering study of the effects of metal cations on the hydration water between phospholipid bilayers

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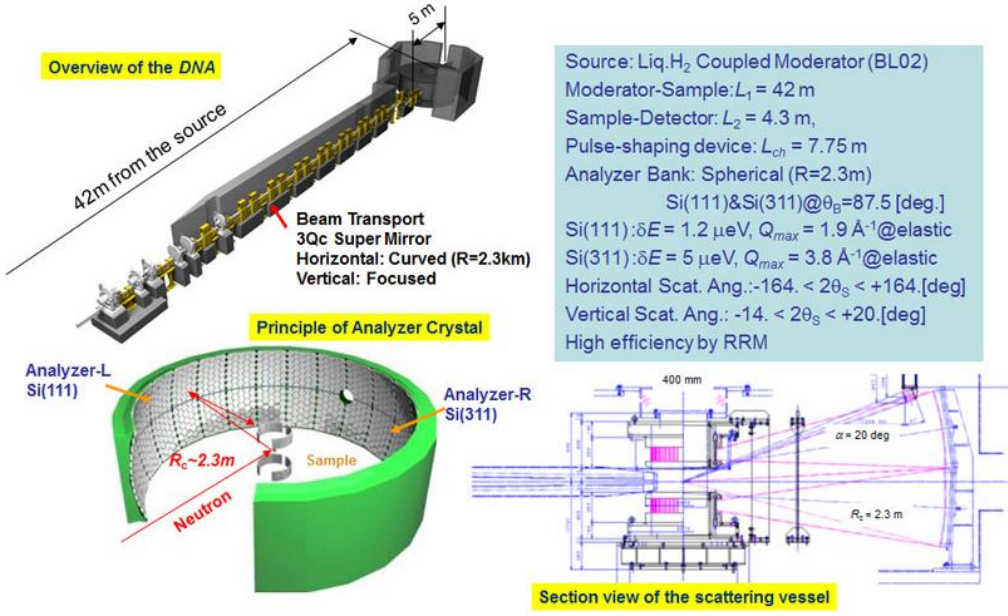

J-PARC MLF BL02 DNA: Dynamic Spectrometer