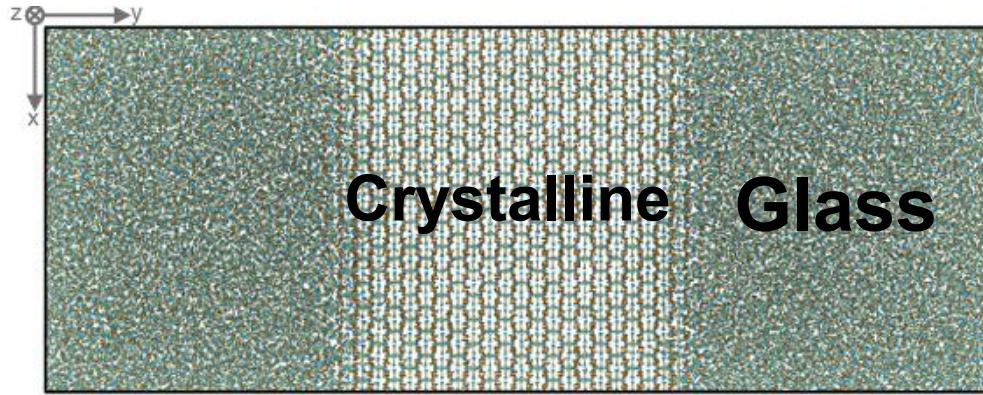
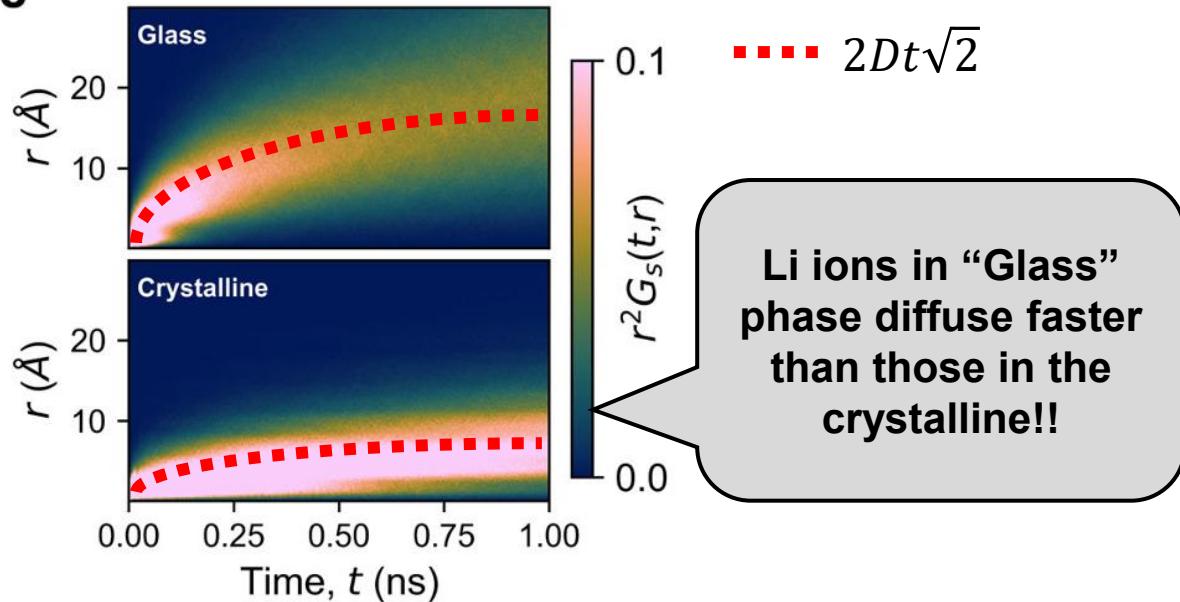


SI Result 1. Lateral Displacement Distribution

Li_3PS_4



C



nature communications



Article

<https://doi.org/10.1038/s41467-025-56322-x>

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

Received: 11 January 2024

Zhimin Chen¹, Tao Du^{1,2}✉, N. M. Anoop Krishnan³, Yuanzheng Yue¹ &

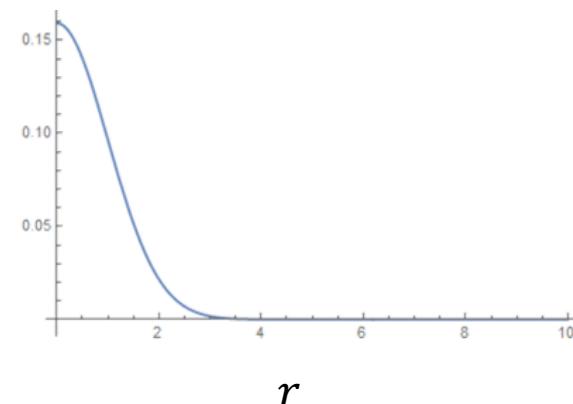
Accepted: 14 January 2025

Morten M. Smedskjaer¹✉

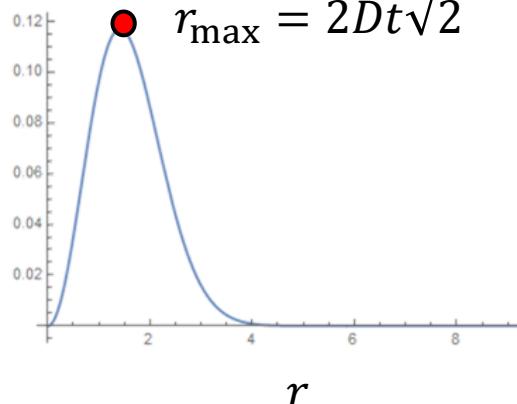
Published online: 26 January 2025

Enhancing the ion conduction in solid electrolytes is critically important for

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



$$r^2 G_S(r, t)$$



r

r

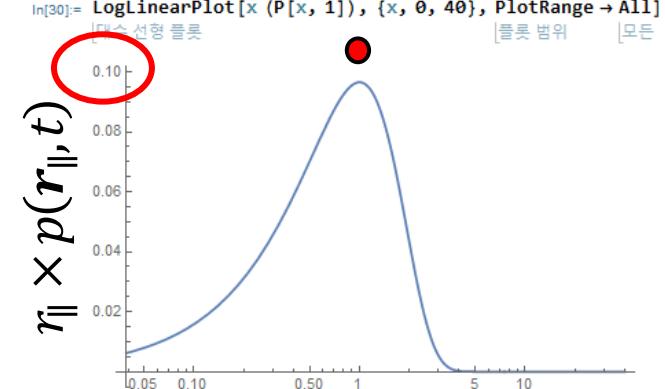
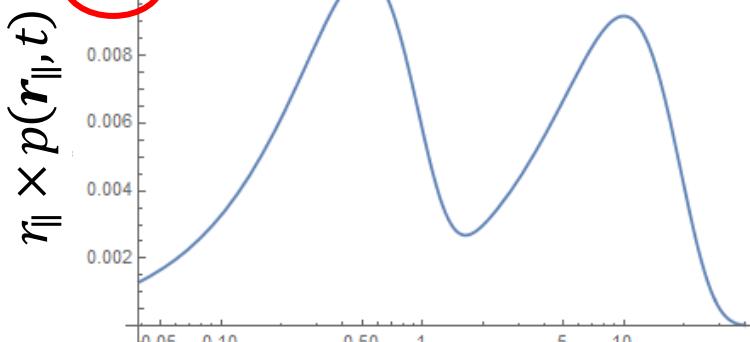
SI Result 1. Lateral Displacement Distribution

$$G_S(\mathbf{r}_{\parallel}, t) \cong \sum_n f_n G_{\mathcal{N}}(\mathbf{r}_{\parallel}, t | D_{\parallel}^{(n)}) \quad \sum_n f_n = 1 \quad G_{\mathcal{N}}(\mathbf{r}_{\parallel}, t | D_{\parallel}) \equiv (4\pi D_{\parallel} t)^{-1} e^{-r_{\parallel}^2 / 4D_{\parallel} t}$$

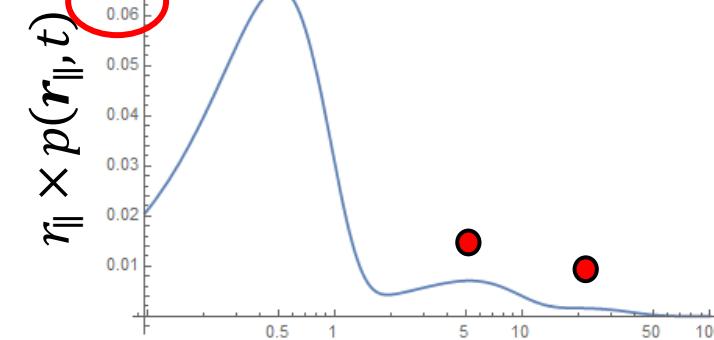
$r_{\parallel} \times G_{\mathcal{N}}(\mathbf{r}_{\parallel}, t | D_{\parallel}) \rightarrow \text{maximum at } r_{\parallel} = \sigma = \sqrt{2D_{\parallel} t}$

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

```
In[28]:= LogLinearPlot[x (0.05 P[x, 0.5] + 0.95 P[x, 10]), {x, 0, 40}, PlotRange → All]
```



```
In[29]:= LogLinearPlot[x (1/3 P[x, 0.5] + 1/3 P[x, 5] + 1/3 P[x, 20]), {x, 0, 100}, PlotRange → All]
```

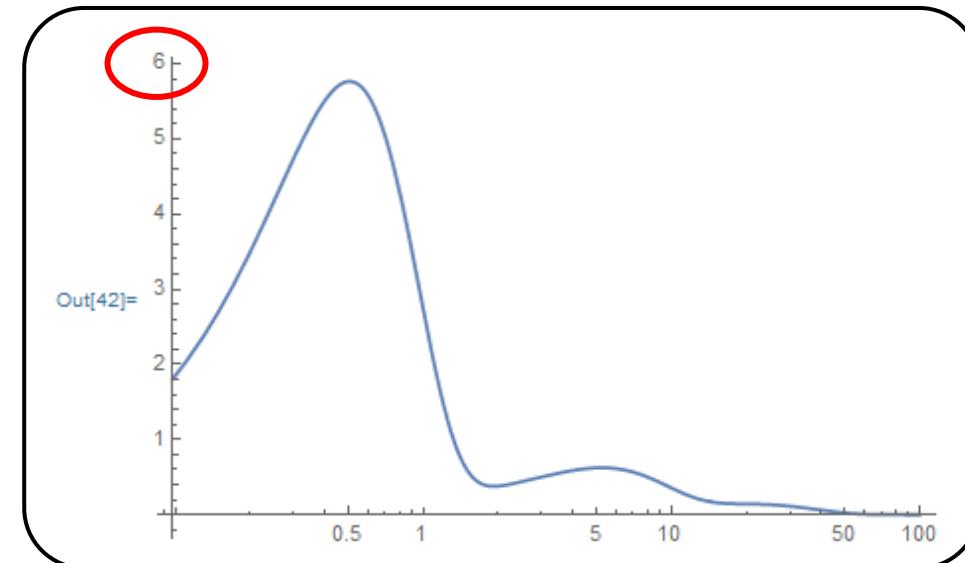
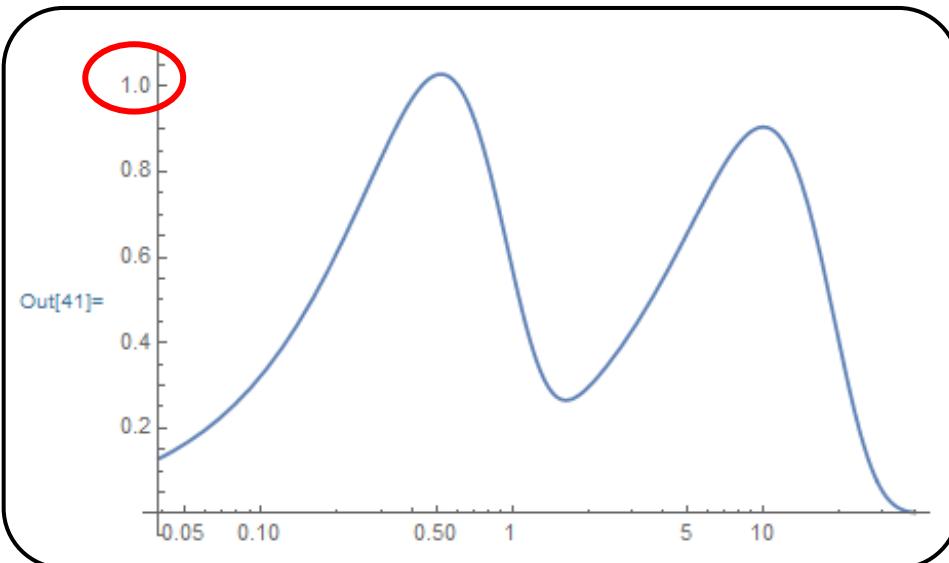
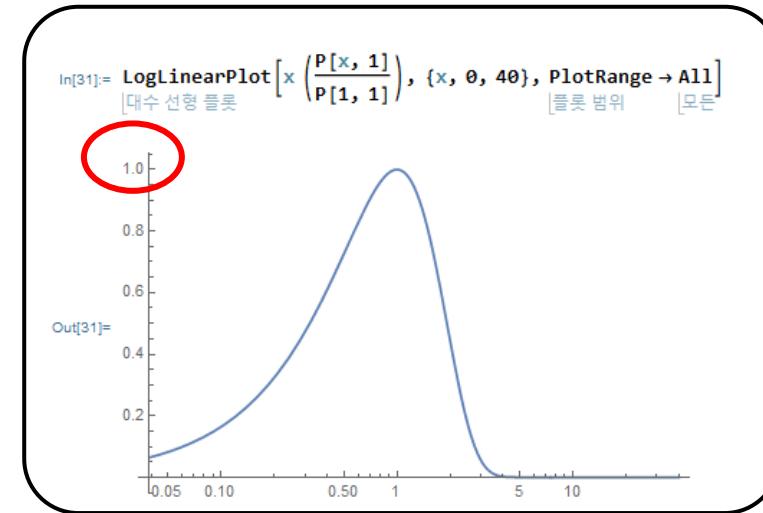


SI Result 1. Lateral Displacement Distribution

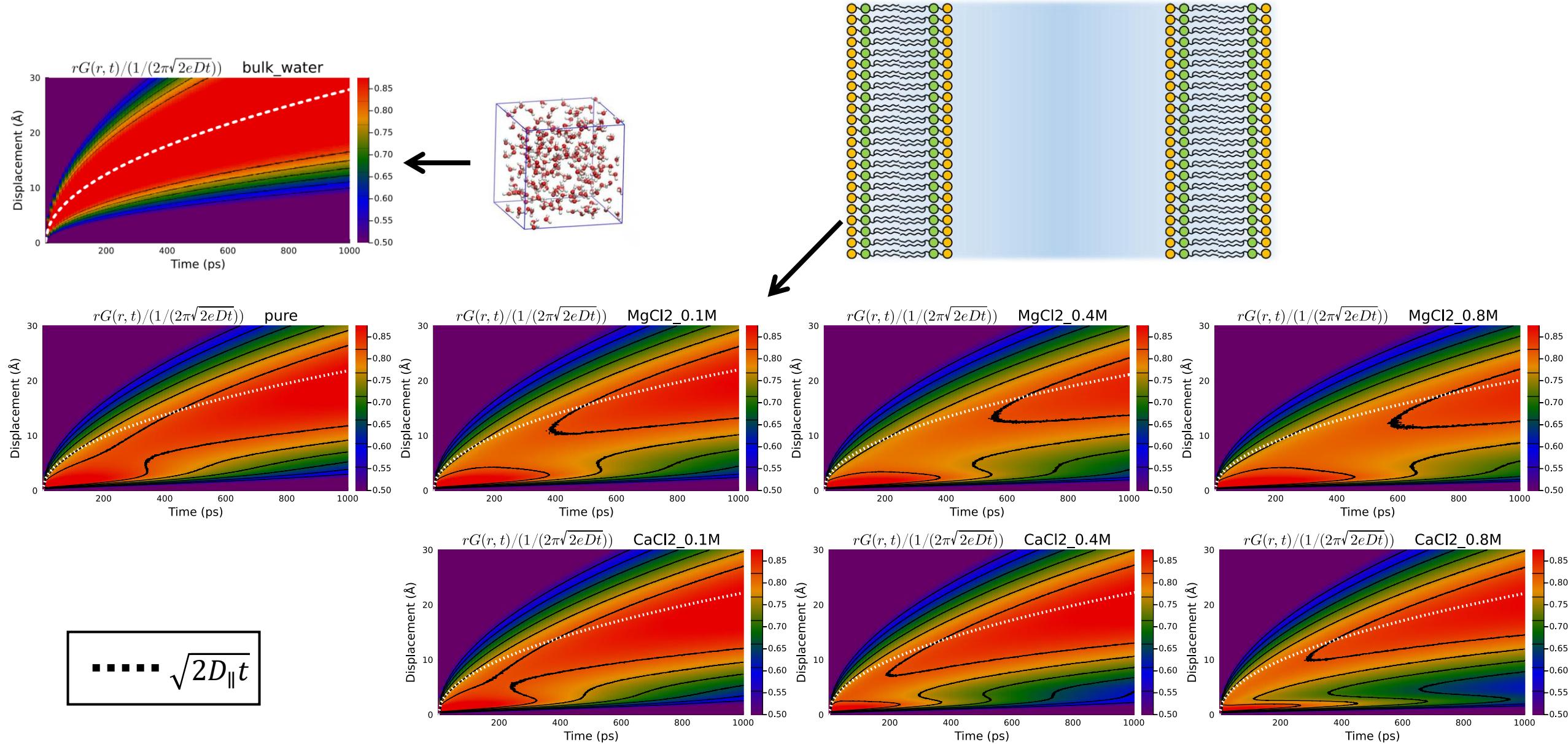
$$G_S(\mathbf{r}_{\parallel}, t) \cong \sum_n f_n G_{\mathcal{N}}(\mathbf{r}_{\parallel}, t | D_{\parallel}^{(n)}) \quad \sum_n f_n = 1$$

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

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

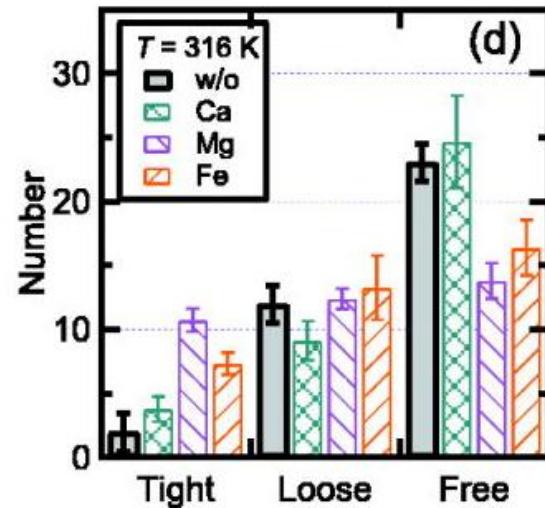


SI Result 1. Lateral Displacement Distribution

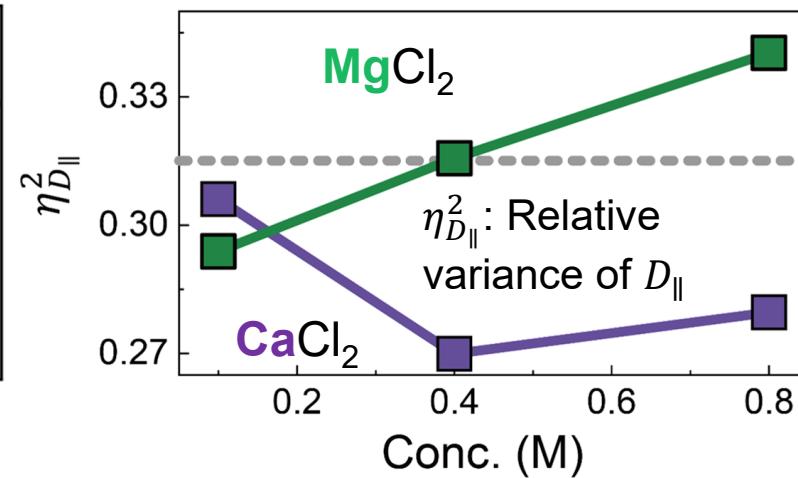
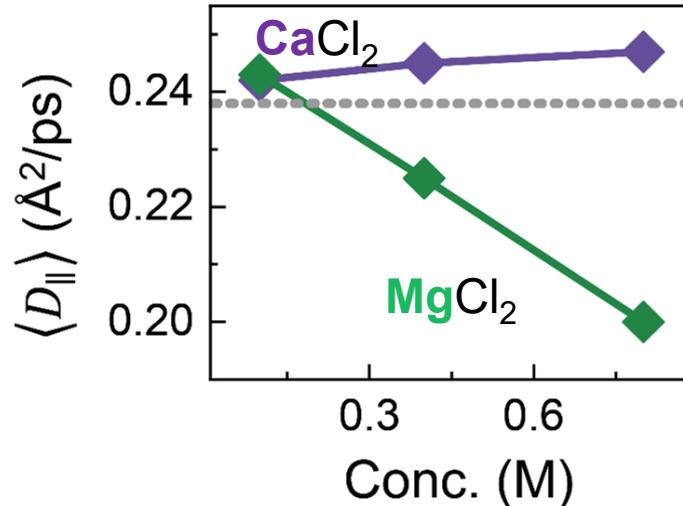
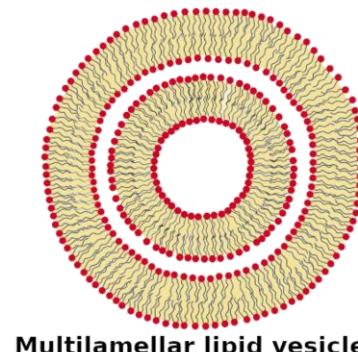


SI Result 2. Experimental result

Fig. 3



[Experiment]
DMPC
37 H₂O/lipid molecule.
0.45 M conc.



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

Cite as: Appl. Phys. Lett. **116**, 133701 (2020); doi:10.1063/1.5144012
Submitted: 31 December 2019 · Accepted: 26 February 2020 ·
Published Online: 30 March 2020

[View Online](#) [Export Citation](#) [CrossMark](#)

H. Seto^{1,a)} and T. Yamada^{2,b)}

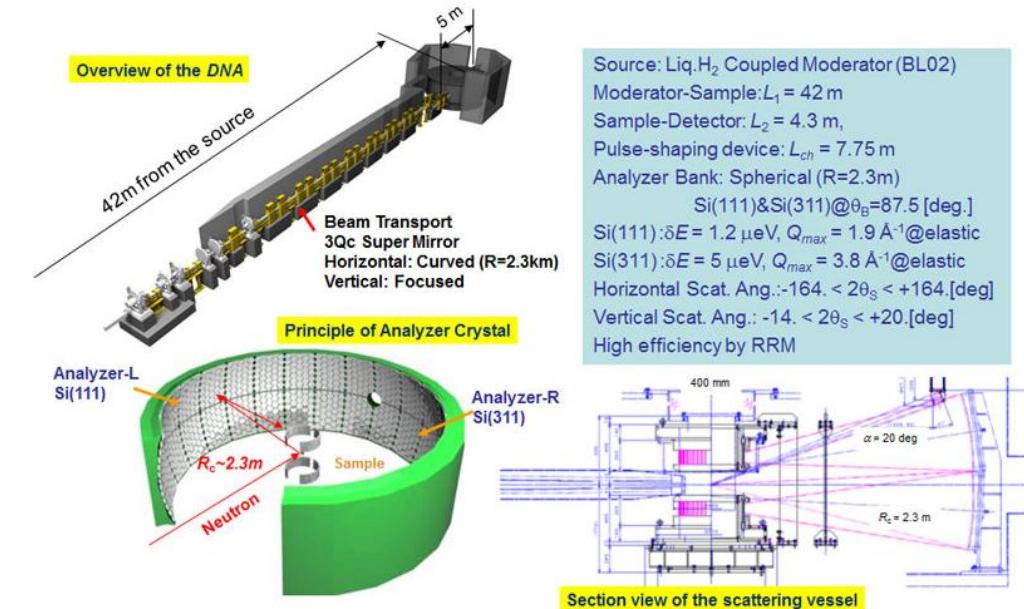
AFFILIATIONS

¹Institute of Materials Structure Science/J-PARC Center, High Energy Accelerator Research Organization, Tokai 319-1106, Japan

²Neutron Science and Technology Center, Comprehensive Research Organization for Science and Society, Tokai 319-1106, Japan

^{a)}Author to whom correspondence should be addressed: hideki.seto@kek.jp

^{b)}Electronic mail: t_yamada@cross.or.jp



J-PARC MLF BL02 DNA: Dynamic Spectrometer