

Supplementary information

Proton spin relaxation study with pulsed NMR on the plasticization of Na⁺ ion-selective electrode membranes prepared from PVCs with different degrees of polymerization

Takayo Moriuchi-Kawakami ^{1,*}, Yuria Sekiguchi ¹, Shintaro Hattori ¹, Takahiro Otsuki ¹,
Keiichi Fujimori ¹, Toshiyuki Moriuchi ² and Yoshiaki Urahama ³

¹Department of Applied Chemistry, Faculty of Engineering, Osaka Institute of Technology, 5-16-1 Omiya, Asahi, Osaka 535-8585, Japan

²Division of Molecular Materials Science, Graduate School of Science, Osaka City University, 3-3-138 Sugimoto, Sumiyoshi-ku, Osaka 558-8585, Japan

³Graduate School of Engineering, University of Hyogo, 2167 Shosha, Himeji, Hyogo 671-2201, Japan

*Corresponding Author E-mail: takayo.moriuchi@oit.ac.jp

Digital images of five types of potentiometric polymeric membranes (membranes 1–5) and NMR samples are shown in Figure S1.

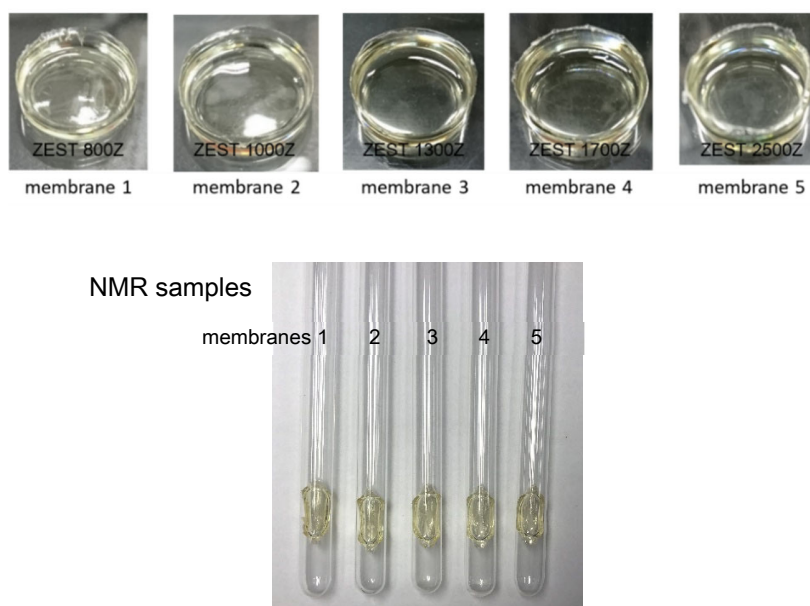


Figure S1. Digital images of the five kinds of potentiometric polymeric membranes incorporating PVCs in different degrees of polymerization and NMR samples.

Since the Solid-Echo and CPMG pulse sequences were only moderately suitable to obtain the T_2 values of the whole viscoelastic electrode membranes, the FID signals for different measurement ranges were collected and smoothed to acquire high-precision transverse magnetization $M(t)$ data (Figure S2). The data $S(t)$ for the normalized derivative spectra were calculated by derivation calculations of $M(t)$ with respect to the logarithmic time. As shown in Figure S3, the relaxation peaks of all the PVCs used ($n = 800, 1000, 1300, 1700$ and 2500) appeared only in short-time regions of up to $30 \mu s$. Figure 4S illustrates the expanded normalized derivative spectra Figure 3.

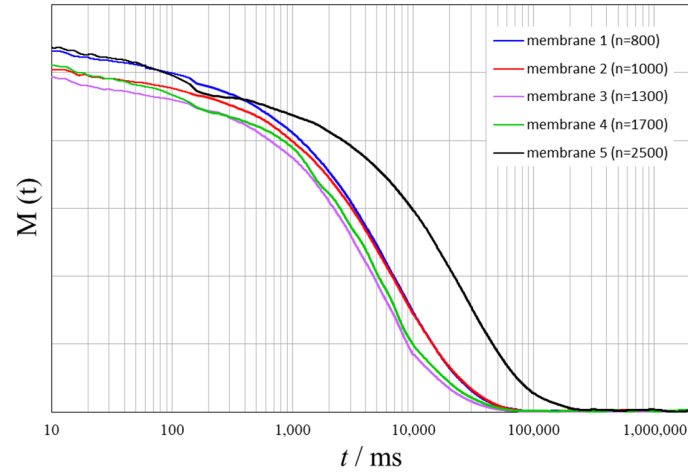


Figure S2. High-precision transverse magnetization $M(t)$ data of the PVC polymers ($n = 800, 1000, 1300, 1700$ and 2500).

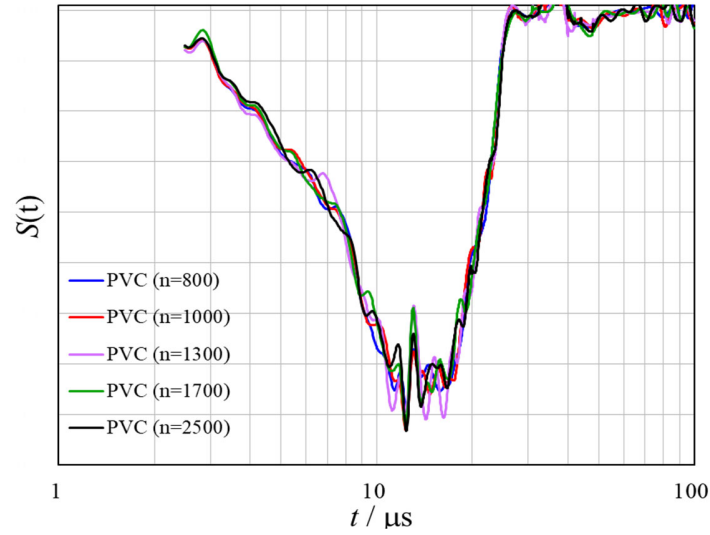


Figure S3. Normalized derivative spectra of the PVC polymers ($n = 800, 1000, 1300, 1700$ and 2500).

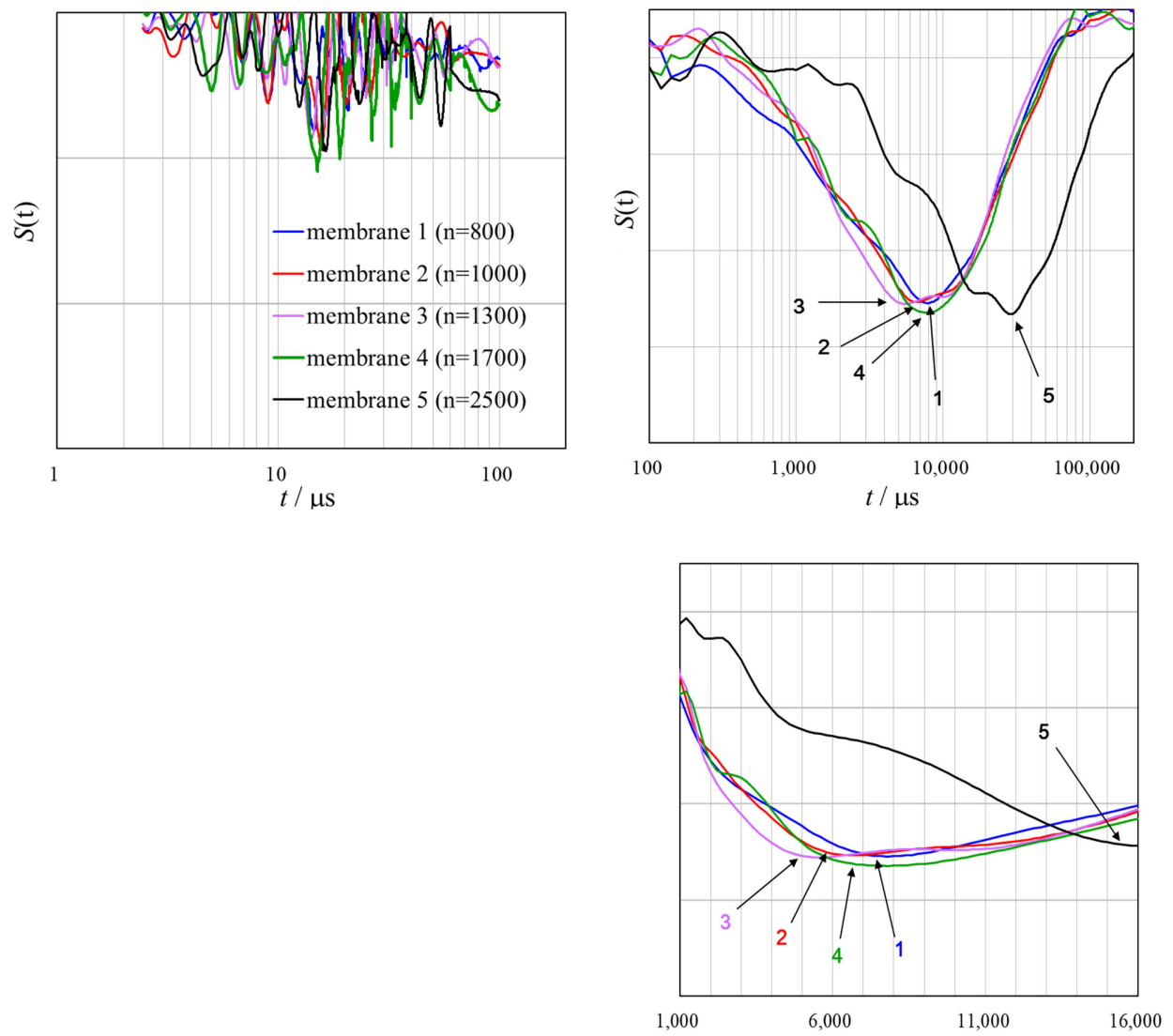


Figure S4. Expanded normalized derivative spectra of Figure 3.