

# Dynamics of Poly(amido amine) Dendrimer in Aqueous Solutions

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Dendrimers, which are one of highly branched polymers, have recently been focused as novel materials. In this work, dynamics of the fifth generation poly(amido amine) (PAMAM) dendrimer with hydroxyl end groups in D<sub>2</sub>O were studied by neutron spin echo (NSE).

PAMAM dendrimer D<sub>2</sub>O solutions were prepared at 1 and 10wt% of dendrimer concentration. NSE measurements were carried out using NSE spectrometer of JRR-3M in Tokai at room temperature. The scattering vector  $Q$  range covered in the experiments was 0.02 to 0.1 Å<sup>-1</sup>. The intermediate correlation functions  $I(Q,t)/I(Q,0)$  were obtained by the normalization of elastic scattering from standard sample Grafoil.

There were obvious difference between the dynamics behavior for two dendrimer concentrations.  $I(Q,t)/I(Q,0)$  at 10wt% could be fitted with single exponential function (Fig. 1a). On the contrary, one at 1wt% was well fitted with the double exponential function (Fig. 1b), including fast

and slow relaxation modes. The diffusion coefficient of the slow mode corresponds to the translational diffusion coefficient estimated by dynamic light scattering. That of the fast mode may be originated by the motion of segments or solvents in dendrimer.

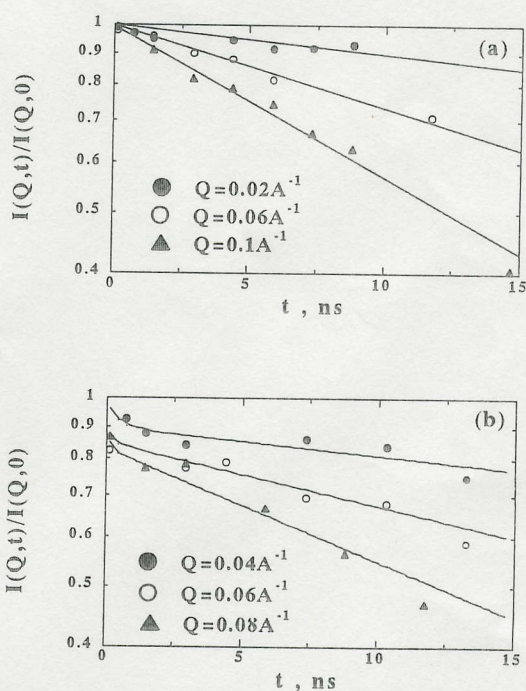


Figure 1  $I(Q,t)/I(Q,0)$  functions as a function of Fourier time  $t$  for 10wt% (a) and 1wt% (b) solutions of PAMAM dendrimer. The solid lines are theoretical ones with single (a) and double (b) exponential functions.