My Research with ESR, NMR and MRI
Tokuko Watanabe
Aoyama Gakuin Women's Junior College

In this talk, I would like to overview my works done together with my colleagues and students, mainly by using NMR methods. Topics are as follows:

- Multiexponential proton relaxation processes of compartmentalized water in gels such as sephadex gels and starch sol and gels.
- Sol/gel transition processes and the network structures of the microbial polysaccharide gellan gum hydrogels, gelatin, and starch gels by $^1$H-NMR relaxation measurement, water diffusion phenomena and circular dichroism methods.
- Theoretical analysis of water $^1$H-T$_2$, based on chemical exchange and polysaccharide mobility during gelation.
- Studies on clay components such as allophone, imogolite, and kaolinite by high-resolution solid-state $^{29}$Si- and $^{27}$Al-NMR and ESR: $^{29}$Si-T$_1$ relaxation, structural variation with SiO$_2$/Al$_2$O$_3$, and thermal transformation.
- Solid state NMR for materials, such as Yttrium compounds, Boron Carbide, by $^{89}$Y, $^{27}$Al, $^{13}$C, $^{11}$B nuclei.
- Development of contrast agents for MRI and evaluation as a new experimental models for MRI.