**The scholarship**

The Japan Society for the Promotion of Science (JSPS) is an independent administrative institution in Japan, organizing and coordinating fundamental research – comparable to the FWF in Austria. It covers all fields of natural sciences, social sciences and the humanities. JSPS plays a pivotal role in the administration of Japan's scientific and academic programmes. One major activity is managing exchange of international scientists by a multitude of incoming and outgoing scholarships. The highly competitive postdoctoral fellowship for research abroad gives excellent young Japanese researchers an opportunity to carry out long-term research, up to two years, at an overseas university or research institution.

**The funded research project**

Dr. Hosoya´s research project addresses the fundamental chemistry of the three classes of key chromophores in cellulosic materials: 2,5-dihydroxy-[1,4]-benzoquinones, 5,8-dihydroxy-[1,4]-naphthoquinones and 2,5-dihydroxyacetophenones. These special colored compounds are very frequently occurring in cellulosics (e.g. cellulosic pulp, paper, and fibers), and there are two reasons for this apparent ubiquity: the compounds are prime survivors of bleaching treatments, and they are readily reformed from low-molecular weight breakdown products of cellulose aging. The reason for the increased resistance towards bleaching chemicals is stabilization by resonance. This combination of difficult removal and easy reformation makes the substances very prominent chromophores in cellulosics and key compounds for studies addressing optimized pulp bleaching sequences or decolorizing treatments of cellulosic materials.

The chemistry of the cellulosic key chromophores has recently undergone a surge of interest from several viewpoints: the pulp and paper industries are interested in better, i.e. faster and cheaper, removal of the compounds from cellulosic pulps, conservationists working with historic cellulosic matrices are looking for mild and compatible ways for their destruction, and cellulose scientists search for good methods of accurate detection, and quantification of their effect on cellulose properties. With the revival of the compounds because of their pivotal role in cellulose yellowing, also the general chemistry of the three chromophore classes - which is the basis of degradation and "discoloration" reactions - became a matter of increased attention.

Comprehensive knowledge of the chemistry and reactivity of the chromophore classes is thus quite important for a fundamental understanding of chemical processes in cellulose aging, bleaching and processing. The project will address the general chemistry of these compounds – formation, chemical behavior, and degradation – by a combination of theoretical studies (quantum-chemical computations) and experiments (kinetics, reaction mechanisms, analytical characterization, degradation and bleaching reactions). The project is carried out at the Department of Chemistry, Division of Chemistry of Renewables.