

Editorial: The Task of Sol-Gel Science and Technology

I would like to consider the task and role of sol-gel science and technology at the chance when issue No. 1, Vol. 4 of the Journal of Sol-Gel Science and Technology, which is the first issue for the year 1995, is published.

Around the year 1970, it was shown that metal alkoxide solutions of pertinent compositions give gels and the gel powder compacts are converted, on heating, to glasses without melting and well-sintered ceramics at much lower temperatures than those required for their conventional fabrication. Since then, many efforts in the sol-gel method were mainly directed to preparation of bulk silica glasses at low temperatures, until the area of the sol-gel method was broadened from glasses and ceramics to all kinds of materials including optical, electronic and biomedical materials in and after 1980's. The most important development of the sol-gel method thereafter is the application of the method to the preparation of inorganic-inorganic and organic-inorganic composite or hybrid materials.

Thus, the present sol-gel method has a great ability of presenting wide varieties of advanced materials characterized by various microstructures (dense, porous, amorphous, polycrystalline, preferentially oriented-crystalline, asymmetric, organic molecule dispersed, metallic and inorganic nanoparticles dispersed, and organic-inorganic composite) and material shapes

(coating film, fiber and bulk bodies, such as rod, plate and disk). It is noted, however, that the most important among those shapes is coatings, because they give the substrates excellent properties with a small quantity of material. Another important characteristics of the method is its low temperature nature.

These abilities of the sol-gel method suggest that this method will be one of the key techniques providing advanced technologies with advanced novel materials.

At present, big projects are directed to the three technology areas: global environment technology, information technology and biotechnology. It is materials that assure the progress of those high technologies. It is important, however, that the materials and production of materials are friendly to the earth and our environments. As stated above, it is quite possible that the sol-gel preparation of materials satisfies these requirements.

Thus the task of sol-gel science and technology is to present materials which support and promote the high technologies and are friendly to the environments on the basis of its high potentiality.

Finally, I hope that this Journal will contribute to the progress of the science and technology of the sol-gel processing.

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