Development of technique for one-pot synthesis of siloxane bonds

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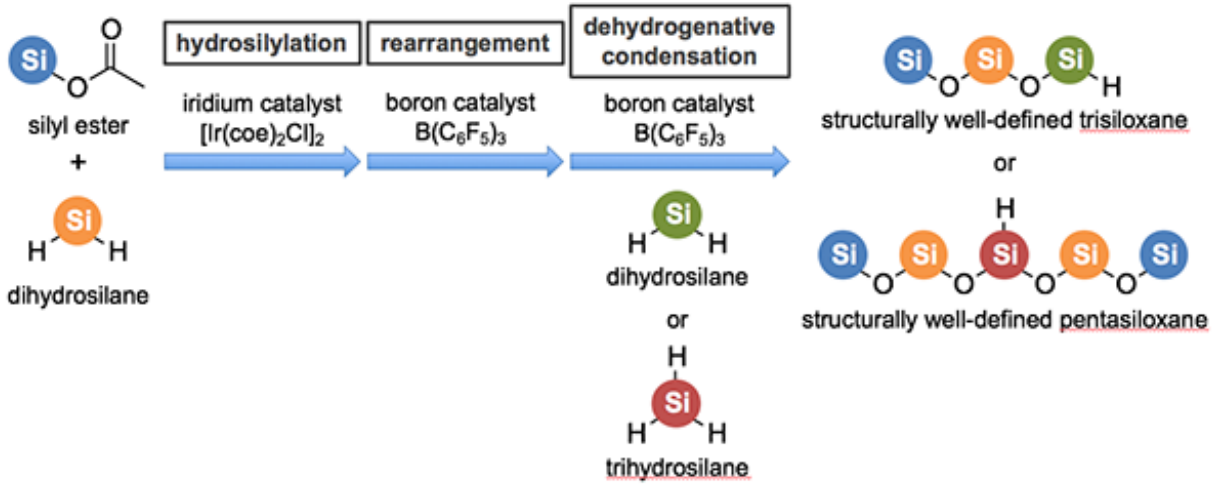

The developed technique for the precise formation of siloxane bonds. Credit: Advanced Industrial Science and Technology

AIST has developed a one-pot synthesis technique that selectively forms siloxane bonds which form the main skeleton of organosilicon materials, in order to synthesize structurally well-defined siloxane compounds in one process.

With the developed technique for one-pot synthesis of siloxane bonds (synthesis in which multiple reactions are made to occur in succession in the same reactor vessel), it is possible to synthesize siloxane compounds

with a structure corresponding to the order in which dihydrosilanes (or trihydrosilanes) are added to the reactor vessel. In principle, by-products are not produced, or they can be easily separated because they are gases at room temperature and pressure. With the developed technique, it is possible to greatly reduce processes such as isolation and purification of products and washing of reactor vessels after each reaction.

In recent years, demand for higher performance and higher functionality of organosilicon materials such as silicone has increased, and there is a need for techniques capable of precisely controlling the structure of organosilicon materials. Although there are techniques capable of selectively forming one type of siloxane bond, such as the cross-condensation method, multistage synthesis has been necessary in order to obtain complex siloxane compounds, and there is the issue of by-product remaining as well. In the present research, the researchers have worked on the development of a new technique for precise formation of siloxane bonds with a different approach from the conventional methods.

The researchers will improve the developed technique to develop techniques by which longer sequences of siloxane bonds can be formed precisely. In addition, highly functional and high-performance organosilicon materials will be developed via structural control which applies the developed technique.

Provided by Advanced Industrial Science and Technology

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