Returnee's Report

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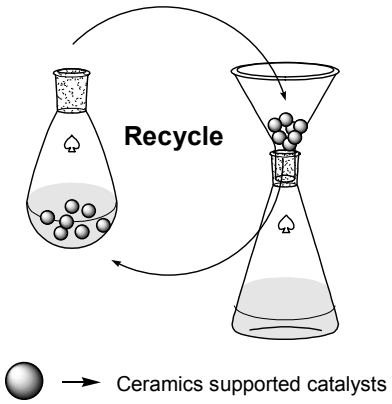
Program Report

<Program Contents>

I planned to develop the asymmetric catalyst that can be used repeatedly from the viewpoint of green chemistry. The most commonly used environment-friendly catalysts are built into porous materials such as zeolites and mesoporous silica. In these catalytic systems, the starting materials are reacted on the surface. After the reaction was finished, the filtrated catalyst can be used again. I planned to construct various ceramics supported catalyst libraries like the proline, cinchona alkaloids etc., which were widely used in asymmetric trifluoromethylation reaction.



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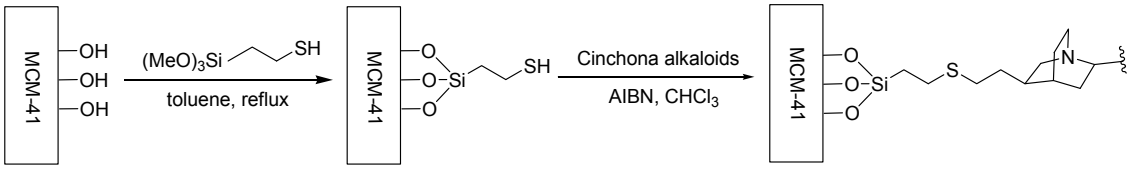

Scheme 1 Preparation of ceramics supported catalysts

Porous materials have various kinds of the shape and the size of the hole. Almost all of them are commercial available. I decided to use the mesoporous silica called MCM-41 this time, because it has already given the great result of a similar concept catalyst. The composition formula of MCM-41 is $SiO_2 \cdot nH_2O$. The surface is processed so that the silicic acid end may become not Si=O but $Si(OH)_2$. First of all, I added the linker part to MCM-41. In addition, various cinchona alkaloids were added to MCM-41 through the linker. After filtration, the solid was subjected to soxhelt extraction and dried under vacuum, the target ceramics supported catalyst was obtained

(**Scheme 1**). Next, the synthesized catalyst was used for various trifluoromethyl building-block reaction such as enantioselective enamine–trifluoropyruvate condensation–cyclization reaction. Though the improvement of enantioselectivity was not seen, the ceramics catalyst certainly takes part in the reaction. We were able to confirm the appearance of enantioselectivity. Moreover, the recycled catalyst showed the same enantioselectivity when this collected catalyst was used again under the same condition. In the future, I want to establish a expeditious and environment-friendly procedure for the preparation of novel trifluoromethylated bioactive compounds by this concept.

Laboratory in Rouen.

Preparation of substrate for this study.

It is a photograph taken at Rouen Station in the morning of the France departure. The center is Dr. Dominique Cahard.