Effect of an added steel-making slag on hydrodechlorination of hexachlorobenzene using metallic calcium

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Persistent organic pollutants (POPs) subsequently effect environmental ecosystem and human health through bioaccumulation. Decomposition of POPs has required hard reaction conditions because of its high thermal stability properties. Therefore, convenient decomposition method under mild conditions has been developed in this research field. Under these circumstances, we have developed a hydrodechlorination method of hexachlorobenzene (HCB) using mixture of metallic calcium and slag made from steel. In this presentation, we report the effect of adding the slag on hydrodechlorination of HCB. In general protocol, 1 mmol of hexachlorobenzene, 0.3 g of blast furnace slag, 5 mmol of metallic Ca, and 10 mL of ethanol were added in a pressure-tight tube and stirred for 24 h at 25 °C or 40 °C. Then the mixture was extracted by hexane and dehydrated with anhydrous MgSO4. The extracted solution was filtrated with syringe filter and analyzed by GC/MS. As the results, the decomposition efficiency of HCB reached 100 % within 24 h at 40 °C. Moreover, it was demonstrated that step-by-step hydrodechlorination proceeded. It seems that dichlorobenzene was easily decomposed to chlorobenzene with adding the slag.

Biography:

Dr. Yumi Katayama, Ph.D in Biological System Sciences (2018, Prefectural University of Hiroshima), is Lecturer in Hachinohe Institute of Technology. She researches about hydrodehalogenation of persistent organic pollutants. She was awarded the First Prize of Student Award in 25th Symposium on Environmental Chemistry in 2016 in Japan. Now, she has studied a new hydrodehalogenation using steel-making slag and metallic calcium which supported by the Environmental Research Grant (Young Research) from Steel Foundation for Environmental Protection Technology in 2018-2020.