Synthesis of graphite-bisulfate compounds and production of graphene

김혜림, 이건홍[1,*]
POSTECH; [1]POSTECH 화학공학과
(ce20047@postech.ac.kr*)

Graphene is the hottest issue in science community because of its prior properties in electrical, mechanical, thermal applications. For the producing graphene in industrial purpose, the exfoliation of graphite intercalation compounds(GICs) receives a lot of attention for the mass production method of graphene. The main feature of GICs is the stage, which is changed with amount of intercalated materials. The exfoliation efficiency of GICs is considered to be affected with their stage. For identifying the relation between exfoliation efficiency and stage of GIC, GICs with diverse stage are needed.
Strong oxidant, $KMnO_4$ is needed when sulfuric acid enters between graphite layers. There are two different approaches to control the stage of graphite-bisulfate compounds. One approach is decreasing the ratio of oxidant to graphite and supplying excess sulfuric acid. Another approach is increasing the ratio of oxidant to graphite and diluting the concentrated sulfuric acid. From these two different approaches, stage 1 to 5 graphite-bisulfate compounds were synthesized. Production of single-layer graphene is also verified from exfoliation of stage-1 GIC.