

Preparation of Mesoporous Material using Deioned Illite Reformed by DBD Plasma

김명훈*, Bac Bui Hoang¹, 성기웅¹, 강일모¹, 송윤구¹, 문희수¹, 이수덕²
연세대학교 화학과; ¹연세대학교 지구시스템과학과;
²(주) 용궁일라이트
(ecomaterials@yonsei.ac.kr*)

Mesoporous materials designed with hydroxyl groups on the surfaces within illite structure reformed by the dielectric-barrier discharge (DBD) plasma were investigated in this study. The chemical composition of the used illites was as followings; aCTMACl: bIllite: c EtOH: 5000 H₂O (a: 0.5-3, b:0.1-1.5, c: 1-5). All reactions were carried out between 313K and 423K under various pH conditons. The crystallized framework was characterized by means of PXRD, TGA, TEM and nitrogen adsorption. Results of XRD and FTIR spectroscopy showed the significant changes between illite samples after and before plasma treatment. Author suggests that after disintegration of the illite layers under specific condition, the fragments of these layers aggregate to form pore around CTMA⁺ ions. This implies that silanol groups, Si-OH, or siloxyl anions, Si-O⁻, on the surface of illite reformed by DBD plasma are interacted as hydrogen bonding with CTMA⁺ and form mesopore whereas the formed mesopore structure aggregated to form the wall of the micropores. The results agreed with t-plot with typical mesoporous materials containing micropores.