Titanium Carbide MXenes with Different Terminations as Platinum Supports for Fuel Cells

홍혜지, Filipe Marques Mota, Nur Aqlili Riana binti Che Mohamad, 조원일[1], 김동하†
이화여자대학교; [1]한국과학기술연구원
(dhkim@ewha.ac.kr†)

MXenes possess attractive hydrophilicity, metallic conductivity, and stability for application in electrocatalysis. Herein, we assess promising Ti_3C_2 as durable and active support candidates in Pt-loaded catalytic systems to drive the 4 electron-driven oxygen reduction reaction (ORR) in the advancement of proton exchange membrane fuel cells (PEMFC). Following the dealumination treatment of corresponding MAX parent materials in the presence of HF, the resulting MXene phase revealed interplanar mesoporosity. Specific electrochemical properties have drawn from the presence of distinct termination groups on the surface of Ti_3C_2. However, the effect of these surface functional groups, which may play a important role to optimize the interaction with loaded Pt nanoparticles, has not been properly investigated to date. In this work, we direct our attention to the influence of these surface functional groups on the resulting interactions with Pt to improve the electrocatalytic activity and stability of Pt-loaded Ti_3C_2 materials toward ORR in PEMFC.