

### Study on the role of citric acid as a pore-replication agent of Fe-N-C catalyst synthesis for alkaline oxygen reduction

김종경, 한성훈, 박찬호<sup>†</sup>

광주과학기술원

(chanho.pak@gist.ac.kr<sup>†</sup>)

Fuel cells have suffered from cost-efficiency issues. The price of platinum (Pt) used as a catalyst is one of the main causes. Iron (Fe) has attracted attention since it is much cheaper and has higher ORR activity in alkaline conditions than Pt. In this study, the content of citric acid was changed compared to 1,10-phenanthroline from 1:1 to 1:8 for the hard-template method. When citric acid was not used, the ratio of micropores to mesopores was 1:1, the specific surface area was 1710 m<sup>2</sup>/g, and the pore volume was 0.96 cm<sup>3</sup>/g. However, when citric acid was added (1:4), the mesopore ratio changed to more than three times that of micropores, the specific surface area was 1210 m<sup>2</sup>/g, and the pore volume was 1.09 cm<sup>3</sup>/g. As a result of the half-cell test, it was found that the half-wave potential was increased by 15 mV compared to the conventional Fe-N-C (891 mV), which was presumed to be due to the increase in exposure of the active sites by the development of the mesopores. These results show the role of mesopores in ORR of Fe-N-C catalyst in alkaline medium and provide the rational design of pore structure.