

## Electrochemical reduction of 4-nitrophenol on boron-doped diamond (BDD) electrode

이유진, 최종영, 양지원\*  
KAIST 생명화학공학과  
(jwyang@kaist.ac.kr\*)

Boron-doped diamond (BDD) thin film has a great attention as a novel electrode material due to its extremely wide electrochemical potential window ( $-1.3 \sim 2.8$  V) and corrosion stability. It is not only used as anode in electrochemical oxidation but also cathode in electro-chemical reduction. In this study, BDD was applied as cathode to reduce 4-nitrophenol (4-NP) in aqueous samples and it was compared with anodic oxidation using BDD and DSA<sup>®</sup> electrode. When 4-NP was destructed by only anodic oxidation, the concentrations of nitrogen intermediates ( $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ) increased. Their concentrations were reduced by applying BDD as cathode but the differences were insignificant. When BDD was used as cathode, COD decreased rapidly compared with control tests with DSA<sup>®</sup>. Nitrate and nitrite concentrations were not changed. It might be the formation of polymer made from polymeric intermediates like aminophenols. In conclusion, 4-NP was removed by cathode reduction as well as anode oxidation using BDD electrode.