Electrochemical application of boron-doped diamond electrodes

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Boron-doped diamond (BDD) electrodes are very attractive material, because of their wide potential window, low background current, chemical inertness, and mechanical durability.[1] In these years, we have reported several examples for electrochemical sensor applications such as detection of influenza virus,[2a] free chlorine,[2b] microsensing system for in vivo real time detection of local drug kinetics[2c], and so on. Furthermore, some of them are developing into practical use. Applications for electrochemical organic synthesis including CO2 reduction[3] are also being developed. For example, we investigated the electrochemical reduction of CO_2 to HCOOH in a flow cell using BDD electrodes. The faradaic efficiency (FE) for the production of HCOOH was as high as 94.7%. Furthermore, the selectivity for the production of HCOOH was more than 99%.

References

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