

## Characterisation of the Sonicated Ring-Pellet Reactor and Sono-Ring-Disc Electrodes

Gavin Macfie<sup>1</sup> and Richard Compton<sup>1</sup>

<sup>1</sup>University of Oxford  
Physical and Theoretical Chemistry Laboratory,  
South Parks Rd.  
Oxford OX1 3QZ  
UK

Collection efficiency measurements are presented for a range of sonicated ring-disc electrodes. Complementary measurements of transient current resulting from a potential step at the disc are reported, showing rapid transport from disc to ring, resulting in steady state limiting currents being established in under 50ms. Comparisons are made with the slower transport in the conventional rotating ring-disc electrode system.

The methodology is applied to a novel sono-ring-pellet reactor, where the disc is replaced with a pellet of solid material. The dissolution of p-chloranil in aqueous media is used as a model system. Dissolution fluxes and heterogeneous rate constants evaluated from this data are in excellent agreement with previously reported independently determined values. **Shortlived intermediate species which are electrochemically invisible in conventional rotating ring-pellet experiments are fully visible and quantifiable in the sono-ring-pellet reactor owing to the much reduced transit times between pellet / disc and ring.** (J. Electroanal. Chem., 503 (2001) 125-132)