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10. Partial Differential Equations

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Electro–reaction–diffusion systems in heterostructures

We consider a general model for the transport of electrically charged species in heterostructures where the redistribution of the species results from their electric interaction, from diffusion processes and chemical reactions. The corresponding initial boundary value problem consists of continuity equations for all species coupled with a Poisson equation for the electrostatic potential. Forced by applications in semiconductor technology we study such equations with nonsmooth data and mixed boundary conditions. For spatial dimension two we present energetic estimates, asymptotic properties and under some restrictions to the order of the reactions an existence result. We discuss some reductions of this basic model which are obtained in the limit if some of the cinetic processes are very fast.

References: A. Glitzky, R. Hünlich, *Appl. Anal.* **66** (1997), 205-226; *ZAMM* **77** (1997) 11, 823-832.