Determination of Tafel lines

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ABSTRACT

Corrosion rates and Tafel lines have been determined by adjusting physical variables in the Butler-Volmer equation. The variables in the equation, i.e. i_{corr}, α_a and α_c have been varied manually to fit experimental polarisation curves from weld zone, heat affected zone and base material. The curve fitting was performed in a potential range close to the corrosion potential, thereby reducing non linear effects such as diffusion and migration. Simulations for combined polarisation have been performed. The simulations indicate that the method yields exact Tafel lines, corrosion potential and corrosion rate, based on potensiodynamic sweeps. This method can therefore be useful in galvanic studies i.e. for welded materials, and also for the interpretation of polarisation curves in general.