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## Electrochemical behavior assessment of Tantalum in aqueous KOH solutions

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The current work aims at studying passive and electrochemical behavior of tantalum in KOH solutions of varied concentrations ranging from 0.01 to 1M using various electrochemical methods. Electrochemical impedance spectroscopy (EIS) results show that the passive film formed on tantalum loses its protectiveness upon addition of KOH concentration. Indeed, the passivity undergoes a drastic change moving toward higher KOH concentrations. The semiconductive behavior of the passive films formed on tantalum is also investigated by employing Mott–Schottky analysis in conjunction with point defect model (PDM). Although semiconducting behavior remains the same as n-type, KOH concentration greatly affects the levels of donor densities. Moreover, Mott–Schottky analysis showed that flat band potential is quite sensitive to KOH concentration.

Keywords: Tantalum; Passive film; EIS; Mott–Schottky; Alkaline solution.

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