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## **Improvement of the corrosion behaviour of molybdenum films by alloying with tantalum**

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Mo films are most commonly used as back-contact layers in thin film transistor (TFT) displays. In production and use of TFT-displays, corrosion plays an important role because it can cause malfunctioning pixels. Since the electrical properties are of major interest for back-contact layers, only a few alloying elements can be considered to improve their corrosion behaviour. In this study, the effect of Ta on structure, electrical and corrosion properties of Mo films was investigated. Several Mo films with different Ta contents ranging from 0 to 100 at.% have been deposited in a laboratory-scale unbalanced d.c. magnetron sputter system on glass substrates. Beside the investigation of microstructure and electrical properties, the electrochemical behaviour is of particular interest. Thus, current density vs. potential measurements and impedance spectroscopy were done in a ventilated 0.9 % NaCl solution at room temperature. Results show that for 20 at.% Ta in the films, the corrosion current decreases from 0.2  $\mu\text{A}/\text{cm}^2$  for pure Mo by a factor of 10 to 0.02  $\mu\text{A}/\text{cm}^2$ . The resistivity is just slightly affected and rises from 14.5  $\mu\Omega\text{cm}$  for a pure Mo film to 19  $\mu\Omega\text{cm}$  for films alloyed with 20 at.% Ta. The results of the impedance spectroscopy provide further qualitative information corroborating the positive influence of Ta.

### **Keywords**

Mo-Ta films

sputtering

structure

electrical resistivity

corrosion resistance