

Ultrathin metal film: an emerging transparent electrode for optoelectronics

L. Martínez¹ and V. Pruneri^{1,2}

1) ICFO-Institut de Ciències Fotoniques, Av. Canal Olímpic, 6830-Castelldefels, Spain

2) ICREA-Institució Catalana de Recerca i Estudis Avançats, 08010 Barcelona, Spain

luis.martinez@icfo.es

We have succeeded in fabricating highly uniform, optically transparent and electrically conductive metal electrodes. Ultrathin films, with thickness as small as 2nm, of aluminum, titanium, nickel and chromium have been deposited by magnetron sputtering at room temperature and studied through electrical, morphological and optical characterization. Optical transparency higher than 90% and electrical resistivities approaching $10^2 \mu\Omega \times \text{cm}$ can be routinely obtained. These properties, combined with low cost and simple deposition technique, make ultra thin metal films an attractive alternative to transparent conductive oxides, such as indium tin oxide (ITO). The proposed technique can also be easily incorporated into an industrial process flow, opening new prospects, for example, in the production of optoelectronic devices, photovoltaic systems and solar cells.

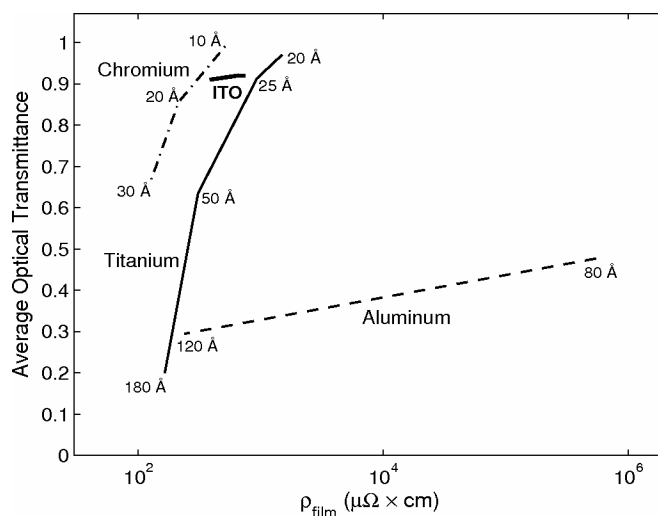


Fig.1. Comparison of optical-electrical performance between several ultrathin metal films and Indium Tin Oxide (ITO).

References

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