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Astrid Bingel, Martin Steglich, Philipp Naujok, Robert Müller, Ulrike Schulz, Norbert Kaiser, Andreas Tünnermann

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**Influence of the ZnO:Al dispersion on the performance of ZnO:Al/Ag/ZnO:Al
transparent electrodes**

**Astrid Bingel^{1,2,*}, Martin Steglich², Philipp Naujok^{1,2}, Robert Müller^{1,2}, Ulrike
Schulz¹, Norbert Kaiser¹, Andreas Tünnermann^{1,2}**

¹ Fraunhofer Institute for Applied Optics and Precision Engineering IOF, 07745 Jena,
Germany

² Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University
Jena, 07745 Jena, Germany

*Corresponding author: Astrid Bingel, astrid.bingel@iof.fraunhofer.de, Fraunhofer
IOF Jena, Albert-Einstein-Str. 7, 07745 Jena, +49 3641 807279(phone), +49 3641
807601(fax)

Abstract

Highly transparent and conductive Al-doped ZnO/Ag/Al-doped ZnO (AZO/Ag/AZO) multilayers were prepared by industrial inline DC magnetron sputtering on glass substrates at room temperature. With optimized film thicknesses of 37 nm/10 nm/37 nm, an optimized low sheet resistance of only 6 Ω /sq and high transmittances of $T_{550}=87.4\%$ at 550 nm and $T_{400-800}=79.9\%$ in the spectral range between 400 nm and 800 nm were reached. Furthermore, an increase of the AZO/Ag/AZO-performance was achieved when a small amount of oxygen was added to the process gas during the AZO deposition which was found to be because of a beneficial adjustment of the AZO dispersion. In this way, owing to both a decreased extinction coefficient as well as a higher refractive index of the AZO film, the maximum transmittance of the AZO/Ag/AZO three-layer structure is further increased ($T_{550}=89.0\%$) and the bandwidth of the transmittance range is broadened (T_{400-

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