

# Improvement of near-infrared diffuse reflectance of silver back reflectors through $\text{Ag}_2\text{O}$ formation by a UV-ozone exposure process

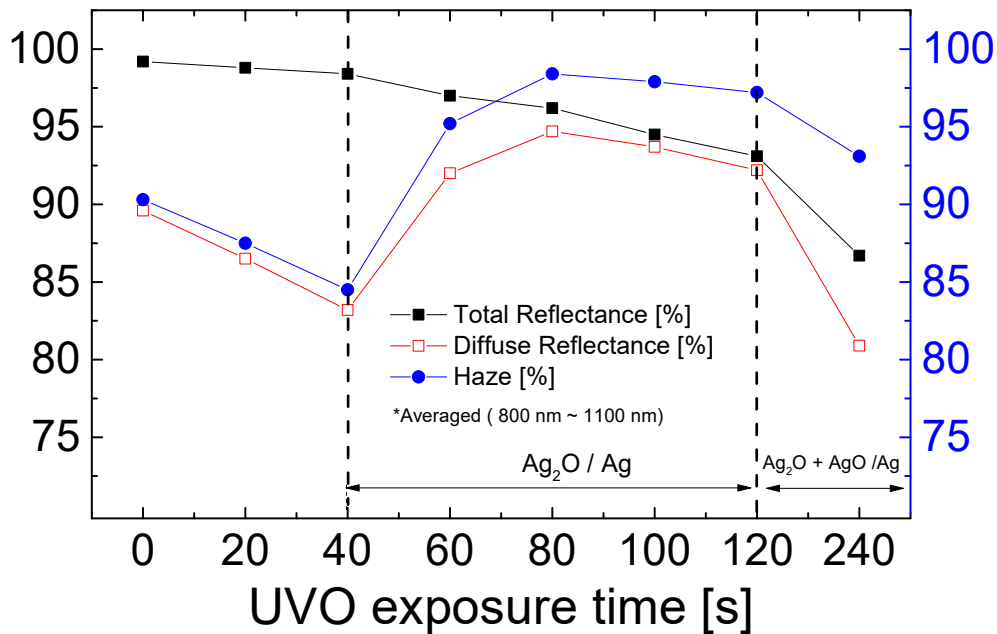
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## Abstract

In this abstract, we communicate on the fabrication and analysis of highly optically reflective textured stacks consisting of silver oxide ( $\text{Ag}_2\text{O}$ ) coated silver for application as scattering back reflectors in thin-film solar cells. Thin  $\text{Ag}_2\text{O}$  layers have been formed on textured silver back reflectors by using a UV-ozone (UVO) exposure technique, and during this formation, the stacks display an improvement of their diffuse reflectance, particularly in the near infrared (NIR) spectral region. The UVO exposure time was optimized to control the chemical composition of the silver oxide that formed. The silver oxide is composed of densely packed small grains with sizes from 20 nm to 50 nm, and their formation measurably increases the roughness of the silver reflector. The optimized silver reflector showed a  $\sim 6\%$  increase in diffuse reflectance (from 800 nm to 1100 nm), maintaining excellent total reflectance (over 95%). As a result, a high haze value ( $\sim 98\%$ ) in the NIR region was achieved using these stacks.



**Fig.** Summarized optical properties of UVO-treated Silver Back Reflector as a function of UVO exposure time.