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Sunglasses Frame: UV Protection beyond Lens Spectroscopy

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Abstract : The present study evaluates the contribution of sunglasses frames as additional eye safety for ultraviolet backscatter light. Current sunglasses standards establish safe limits regarding lens transmittance in the 280 nm to 380 nm range. However, frames are additionally relevant in protecting the eyes from ultraviolet exposure. This study involves the use of a prototype that simulates backscattered light environments and quantifies the contribution of the frame as a function of the light that reaches the eye when wearing sunglasses. The prototype consists of an LED illuminated sphere, a mannequin head with optical sensors, and baseline and measurements are performed. A set of 29 samples was tested, and results show the variation of light blocking presented by different types of frames, ranging from 68% to 80%. This is still ongoing research. Prototype improvements for allowing albedo simulation, as well as the six types of sky simulation, are being implemented to show the intensity of UV light reaching the eye for several environments worldwide.

Keywords : sunglasses standards, sunglasses frame, ultraviolet protection, albedo
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