UTILISING POLYPHENYLENE OXIDE FOR LONG TERM SOLAR UVA DOSIMETRY

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Exposure to UV radiation is known to be a causative factor in the induction of skin cancers and other sun-related disorders. Most acute responses of humans to UV exposure occur as a result of UVB (280 to 315 nm) exposures, as these wavelengths are highly sensitive in creating a human biological response. However, this does not mean that UVA radiation has no impact on human UV exposures and health. UVA can cause erythema in human skin, yet, the exposures required to create such a response is much larger than UVB radiation. UVA radiation penetrates much deeper into human skin tissue than UVB, resulting in impacts that are not as acute, taking many years to manifest. Past research has shown that UVA (315 to 400 nm) plays a significant role in human skin carcinogenesis. Studies have also shown that UVA plays an important role in skin damage, immune suppression, DNA damage, photoageing and wrinkling.

Researchers at the University of Southern Queensland have developed a personal UV dosimeter that can quantitatively assess long term solar UVA exposures. The chemical polyphenylene oxide, cast in thin film form and which is responsive to both the UVA and UVB part of the spectrum was used and filtered with mylar. This combined system responded to the UVA wavelengths only and underwent a change in optical absorbance as a result of UVA exposure.

Preliminary results indicate that this UVA dosimeter saturates reasonably slowly when exposed to sunlight and can measure exposures of more than 20 MJm^{-2} of solar UVA radiation with an uncertainty level of no more than ± 5%.