Exploring Protective Barriers for the Outer Layer of Spacesuits and Visors

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Exposure to UV radiation may cause radiation poisoning as well as skin cancer to astronauts. Will vinyl (new idea) have better UV protective capabilities on the outer layer of astronaut suits than present day nylon? Between which two chemical suspensions (ZnO and TiO2) coated onto astronaut visors would further enhance UV protection? UV reactive colour changing beads were used with a UV torch to test which fabric (nylon or vinyl) would let through none or the least UV light. The UV torch method was used to test the coated plastic lenses representing the visors. ZnO and TiO2 were tested separately in sunflower oil and separately in acetic acid (four suspensions tested in total). The fabrics and coated lenses were first tested in a black box; then a black cylinder was used to concentrate the UV light of the torch. A digital lux meter was used to confirm the results of the beads, followed by further verification via a spectrometer. Of the fabrics tested, vinyl proved not to let any UV light through. ZnO in sunflower oil let through the least UV light through the plastic lenses. Data collected from the two verification methods concluded that the original testing of the UV reactive colour changing beads that vinyl is best suited against UV light penetration, due to the type of materials vinyl consists of. The short zinc oxide bonds together with the sunflower oil let through the least UV light of the four suspensions tested.

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