

# VUV-VIS optical characterization of Tetraphenyl-butadiene films on glass and specular reflector substrates from room to liquid Argon temperature

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The use of efficient wavelength-shifters from the vacuum-ultraviolet to the photosensor's range of sensitivity is a key feature in detectors for Dark Matter search and Neutrino physics based on liquid argon scintillation detection. Thin film of Tetraphenyl-butadiene (TPB) deposited onto the surface delimiting the active volume of the detector and/or onto the photosensor optical window is the most common solution in current and planned experiments. Detector design and response can be evaluated and correctly simulated only when the properties of the optical system in use (TPB film + substrate) are fully understood.

The main features of TPB coatings on different, commonly used substrates is reported, Measured features include TPB emission spectra with lineshape and relative intensity variation recorded as a function of the film thickness and for the first time down to LAr temperature, as well as optical reflectance and transmittance spectra of the TPB coated substrates in the wavelength range of the TPB emission.

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