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Fabrication of Optical Tissue Phantoms Simulating Human Skin and Their Application

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Abstract : Although various optical tissue phantoms (OTPs) simulating human skin have been actively studied, their completeness is unclear because skin tissue has the intricate optical property and complicated structure disturbing the optical simulation. In this study, we designed multilayer OTP mimicking skin structure, and fabricated OTP models simulating skin-blood vessel and skin pigmentation in the skin, which are useful in Biomedical optics filed. The OTPs were characterized with the optical property and the cross-sectional structure, and analyzed by using various optical tools such as a laser speckle imaging system, OCT and a digital microscope to show the practicality. The measured optical property was within 5% error, and the thickness of each layer was uniform within 10% error in micrometer scale.

Keywords : blood vessel, optical tissue phantom, optical property, skin tissue, pigmentation
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