Data Descriptor

Measurement of the Temporal and Spatial Temperature Distribution on the Surface of PVCP Tissue Phantom Illuminated by Laser Dataset

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Abstract

The dataset entitled Measurement of the temporal and spatial temperature distribution on the surface of PVCP tissue phantom illuminated by laser was obtained with a laboratory set-up for characterisation of the thermal properties of optical tissue phantoms during laser irradiation. The dataset contains a single image file representing the spatial temperature distribution on the surface of a PVCP tissue phantom. This thermal image was captured at the moment when the temperature reached its maximum value as a result of irradiation with a dermatological laser.

Keywords: IR thermography, lasers in medicine, thermal properties of tissues, optical skin phantoms, tissue-mimicking phantoms

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Specification table (data records)

Subject area	Metrology, Electronics, Sensors, Biomedical engineering
More specific subject area	Thermal imaging
Type of data	Image
How the data was acquired	The data was collected at the Gdańsk University of Technology by the use of a dedicated measurement setup consisting of a thermographic camera and dermatological laser system
Data format	Image file in .bmp format

Experimental factors	The data contained in the dataset were not processed
Experimental features	The measurement setup consisted of: VIGOcam v50 thermographic camera from VIGO System S.A., pulsed dermatologic 20W diode-laser emitting at 975 nm
Data source location	MOST Wiedzy Open Research Catalog, Gdańsk University of Technology, Gdańsk, Poland
Data accessibility	The dataset is accessible and is publicly and freely available for any research or educational purposes

Background

The use of lasers in medicine is constantly increasing. They have proven useful in many fields of medicine, both in diagnostics and therapy. In dermatology, they are used in the removal of superficial skin lesions such as discoloration, pathological and vascular lesions (Szymańczyk et al., 2017). Nevertheless, before a new laser is introduced into clinical practice, its ability to interact with tissues has to be carefully examined and it has to be properly calibrated. In order to do this, optical skin phantoms can be used (Jędrzejewska-Szczerska et al., 2015; Wróbel et al., 2015). Such phantoms closely imitate the thermal and optical properties of real human skin (Bashkatov et al.,2018). To be able to create such materials, the correlation between the proportions of ingredients and properties of the obtained phantoms has to be examined. Therefore, to perform this task, appropriate laboratory set-ups, such as the one used in this study, are produced.

The dataset, Measurement of the temporal and spatial temperature distribution on the surface of PVCP tissue phantom illuminated by laser, provides the possibility for other researchers and engineers to compare and validate the results of measurements obtained for other tissue phantoms as well as tissue samples and for different laser systems.

Methods

The measurements were carried out by the use of a dedicated measurement setup, which consists of a thermographic camera and dermatological laser system with a 975 nm diode laser module (Fig. 15.1).

The measurement setup consists of a VIGOcam v50 thermographic camera from VIGO System S.A. and a pulsed dermatologic 20W diode-laser emitting at 975 nm. The pulsed diode laser was described in detail by Piechowski (Piechowski et al., 2012). A detailed description of the system and experimental procedure were provided by Wróbel (Wróbel et al., 2016).

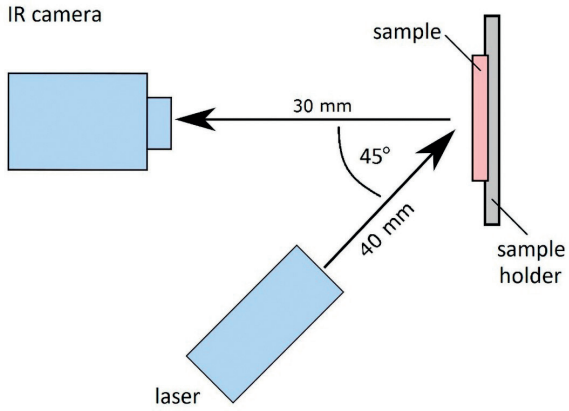

Fig. 15.1. Measurement setup

Data quality and availability

This dataset can be used by other research groups to compare the results of measurements obtained for another tissue phantoms as well as tissue samples and to validate their measurement process with the use of different laser systems.

Dataset DOI
10.34808/ga0d-gj04

Dataset License
CC-BY-NC

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