Measurement of Laser Ultrasound Impact Pressure and transmission in Dental Tissue Using Uniaxial Polyvinylidene Fluoride (PVDF) Sensor and Pyroelectric Joulemeter

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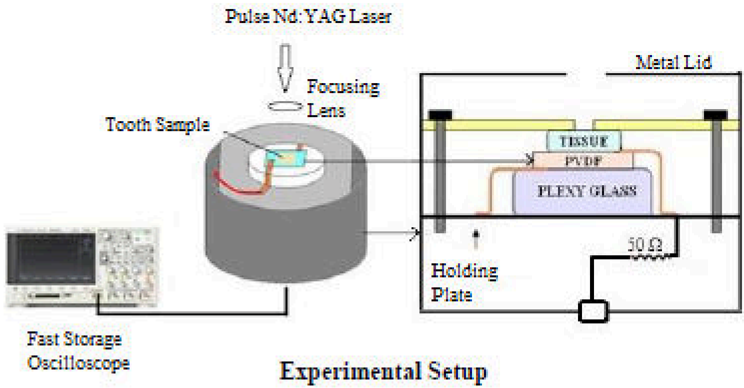
Abstract:

In this research, a customized PVDF-based photoacoustic sensor is designed, constructed and applied to measure the loading impact of laser-induced ultrasound on biological sample such as dental enamel tissue during a dental operation. The acoustic energy transmission within the sample is also investigated. The results showed that a maximum applied force and stress of about 6 N and 800 Pa are measured by the sensor using a pulse Nd:YAG laser with 1.06 μm wavelength. These values are well below the tensile strength of a normal tooth mainly because of the low energy level of the laser.



Experimental Setup