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Optical wave microphone measurement and analysis on pulsed laser irradiation to solid FUMIAKI MITSUGI, Kumamoto University, RYOSUKE KOZAI, TOSHIYUKI NAKAMIYA, YOSHITO SONODA, Tokai University, TOMOAKI IKEGAMI, Kumamoto University — In the plasma process such as ablation, optical measurement technique to detect information on the interaction of laser and solid surface has attracted much interest. In this work, plasma induced shock, thermal and photoacoustic waves generated by pulsed laser irradiation were measured via optical wave microphone technique. This method has potential to detect high frequency density change of gas, liquid as well as plasma. A pulse of Nd:YAG laser (532 nm) was irradiated on Si wafer (t=0.5, 1.0 mm). The laser energy density was varied from 20 to 200 mJ/cm^2. The optical wave microphone measurement was carried out both at the laser irradiated surface and the back side of the Si changing the distance between the probe beam and the surface of the Si. The measured signal was analyzed by FFT. We could detect photoacoustic signal at the surface side and back side of the Si wafer via optical wave microphone. The piezoelectric sensing for the signal was also carried out for comparison. The signal intensity showed proportional property to the irradiated laser energy density.

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