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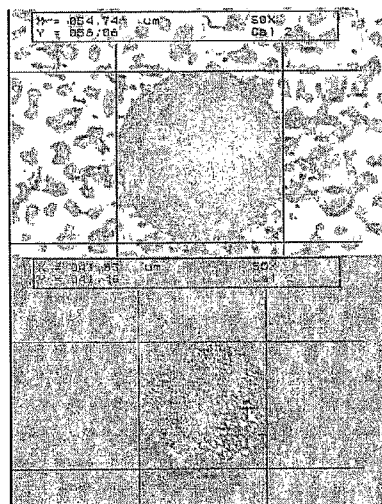
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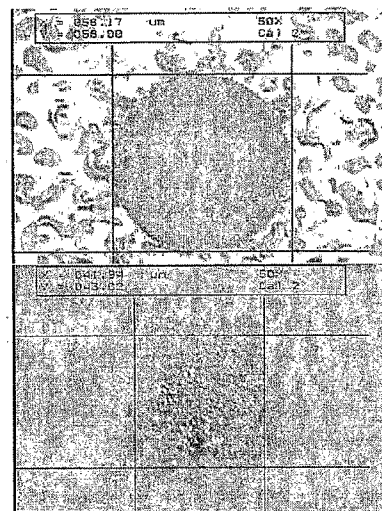
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[Continued on next page]

(54) **Title:** METHOD OF PROVIDING CONSISTENT QUALITY OF TARGET MATERIAL REMOVAL BY LASERS HAVING DIFFERENT OUTPUT PERFORMANCE CHARACTERISTICS



Laser A, Rep-Rate = 60 kHz,
Pulse Width = 23.4 ns, Pws = 1.16 W,
 $F = 0.73 \text{ J/cm}^2$



Laser B, Rep-Rate = 60 kHz,
Pulse Width = 136.6 ns, Pws = 1.10 W,
 $F = 0.70 \text{ J/cm}^2$

(57) **Abstract:** Laser pulse energy adjustments are motivated by an understanding of the effect of laser pulse width variations among different lasers on satisfying a quality metric associated with a laser-processed target. In a preferred embodiment, the adjustments normalize this effect among different lasers drilling vias in a target specimen. The number of pulses delivered to the target specimen to form each via can be modified, based on the pulse energy applied to the via location, to control different via quality metrics.

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