

Vibration assisted femtosecond laser hole drilling with taper angle control on Invar for AMOLED Fine Metal Mask

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Active Matrix Organic Light Emitting Diode (AMOLED) is opening new display world with excellent strong point which are ultra-thin, bendable, foldable, transparent, and good color gamut [1, 2]. This paper describes about vibration assisted femtosecond laser taper angle controllable hole drilling on Invar alloy for Fine Metal Mask (FMM) used RGB evaporation process in AMOLED display production [3, 4]. We studied effect of ‘first pulse focusing point’ and ‘focus point moving direction’ when laser hole drilling process with continually changing focusing plane of objective lens by vibrator. And taper angle control hole drilling is successfully demonstrated with vibration amplitude adjustment. Using 1027 nm of central wavelength, 190 fs of pulse duration, and 100 Hz of vibration frequency, taper angle is controlled by vibration amplitude range of 31.8° ~ 43.9°. Taper angle controllable femtosecond laser hole drilling process could be used in field of Smart watch, high resolution display, precision machining, nano/micro machining, and FMM fabrication.

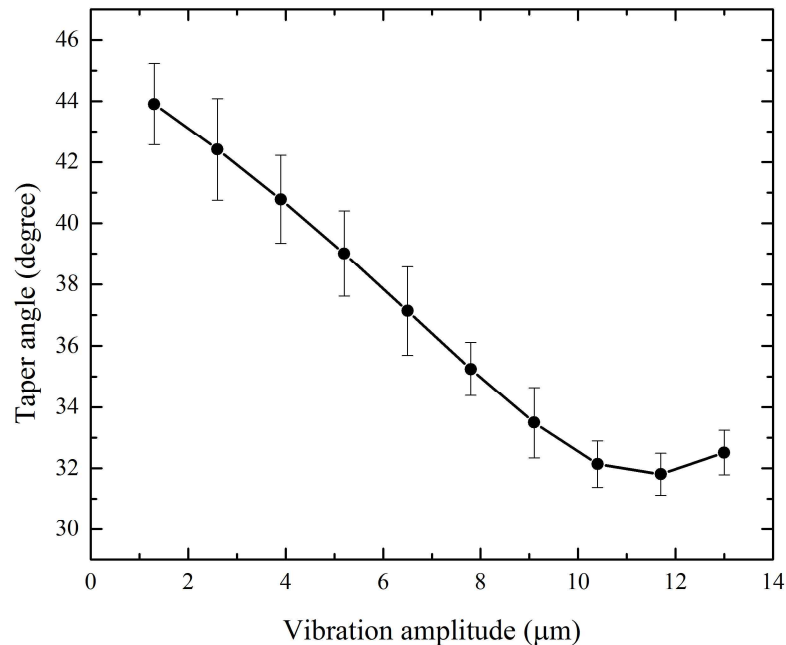


Figure 1 Graph of ‘Vibration amplitude’ and ‘Taper angle’ in condition of 1027 nm central wave length, 190 fs pulse duration, 100 kHz repetition rate, 8 pulses, 27.8 μJ pulse energy, 100 Hz vibration frequency, 50X objective lens.

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