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AIP Conference Proceedings

Volume 1958, 9 May 2018, Article number 020005

3rd International Conference on the Science and Engineering of Materials, ICoSEM 2017; Armada Hotel Kuala Lumpur; Malaysia; 24 October 2017 through 25 October 2017; Code 136346

Surface morphology study in high speed milling of soda lime glass

(Conference Paper)

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Abstract

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Soda lime glass has a wide range of applications in optical, bio-medical and semi-conductor industries. It is undeniably a challenging task to produce micro finish surface on an amorphous brittle solid like soda lime glass due to its low fracture toughness. In order to obtain such a finish surface, ductile machining has been exploited, as this usually cause's plastic flow which control crack propagation. At sub-micro scale cutting parameters, researchers achieved nano finish surface in micro milling operation using coated tool. However it is possible to enhance the rate of material removal (RMR) of soda lime glass at flexible cutting condition. High speed cutting at micro meter level, extend of thermal softening might be prominent than the strain gradient strengthening. The purpose of this study was to explore the effects of high cutting speed end milling parameters on the surface texture of soda lime glass using uncoated carbide tool. The spindle speed, depth of cut and feed rate were varied from 20,000 to 40,000 rpm, 10 to 30 mm/min and 30 to 50 μm respectively. Mathematical model of roughness has been developed using Response Surface Methodology (RSM). Experimental verification confirmed that surface roughness (R_a) 0.38 μm is possible to achieve at increased RMR, 4.71 mm³/min. © 2018 Author(s).

ISSN: 0094243X

ISBN: 978-073541659-8

Source Type: Conference Proceeding

Original language: English

DOI: 10.1063/1.5034536

Document Type: Conference Paper

Volume Editors: Jamaludin M.F., Metselaar H., Hoong W.Y., Mahmoodian R.

Sponsors:

Publisher: American Institute of Physics Inc.

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