Study on Precision Polishing of a Mini Roller Mold

趙崇禮,Y. C. Hsiao,W. C. Chou,C. W Kuo,W. L. Lai,H. Y Lin,馬廣仁
Mechanical Engineering
Engineering
ma600229@ms17.hinet.net

Abstract

This research aimed to design and develop a polishing system for precision polishing
mini roller mold to nanometer surface finish. An experimental polishing system was built in the present study to polish nickel plated specimens with various polishing compounds. The polished specimens were subsequently examined by Alfa-step, OM and SEM for surface finish, morphology and microscopic analysis respectively. The obtained surface condition and material removal rate were correlated to the polishing parameters such as spindle speed, abrasive concentration, and abrasive grit size for the improvement of the polishing effect. Mini-rollers of 5mm in diameter, 50mm in length were successfully polished to a surface roughness better than 2nm Ra in several hours without damaging the roundness and cylindricalness using abrasive of 0.3μm, 10,000rpm polishing speed and 0.5mm gap distance between polisher and the specimen. A semi-empirical
model of polishing was also developed in the study for predicting the materials removal rate.

Keyword：polishing, cylindrical specimen, float polishing.