Ni Cantilever Fabrication by Transfer Process without Sacrificial Layer

Hiroaki Kawata*, Masaaki Yasuda and Yoshihiko Hirai

Graduate School of Engineering, Osaka Prefecture University
1-1 Gakuenchou, Sakai city, Osaka 599-8531, Japan

(Received April 19, 2004; accepted July 12, 2004)

Key words: transfer process, Ni cantilever, no sacrificial layer, epoxy resin, atmospheric pressure press

Nickel cantilevers, the beam lengths of which ranged from 100 µm to 1000 µm in 100 µm increments and the width of which was 100 µm, were fabricated on a glass substrate by the transfer process. The cantilevers were fabricated on a dummy substrate and transferred to a glass substrate using an epoxy resin as an adhesive layer. No sacrificial layer was used. Because a conventional aligner was used in the bonding process, the glass substrate could be aligned with the dummy substrate. The substrates were pressed together at atmospheric pressure during bonding by evacuating the sample bed. The glass substrate adhered to the dummy substrate after being pressed. The force required to separate the substrates was increased by the additional bond between the dummy and the glass substrates in most samples. Even when the separation was successful, all beams longer than 800 µm were fixed to the glass substrate and about 50% of the beams shorter than 700 µm acted as vibratory beams. The resonant frequencies were similar to those calculated using the parameters for bulk Ni. The vibratory beams bent upwards from the substrates.

*Corresponding author, e-mail address: kawata@pe.osakafu-u.ac.jp