Low temperature assembly method of microfluidic bio-molecules detection device

Detection principle of the microfluidic device

Detection target: nucleoprotein A (Influenza A virus proteins)

Sensor: interdigitated capacitive electrodes

Biofunctionalization: grafting of anti-nucleoprotein A antibodies on the electrodes

Measurement: the capacitance variation induced by the fixation of gold–labeled Ab anti-Influenza A on the sensing area

Assembly of the bio-sensor in DIL package

The bio-sensor is sensitive to contaminants, temperature above 37°C and UV exposure. Need for alternative packaging method

Die attach:
Standard: high T cure adhesive

Alternative: RT cure adhesive

Wire bonding:
Standard: Au wire bonding (200°C)

Alternative: RT Al wire bonding

Encapsulation:
Standard: hight T curable encapsulant

Alternative: UV curable encapsulant

- higher viscosity to define a sensing area

- lower viscosity to encapsulate the Al wires

UV intensity: 18.5 W/cm², wavelength: 320 – 500 nm, duration: max 20 s

Results and conclusion

We injected food coloring to investigate the hermeticity:

We developed low temperature assembly methods which cause no damage to the biological layer grafted on the bio-sensor.