KAJIHARA LAB.

[Novel THz microscopy and metal/polymer joining]

Department of Mechanical and Biofunctional Systems

Manufacturing Science Fundamentals

Department of Precision Engineering

http://www.snom.iis.u-tokyo.ac.jp

Novel THz Microscopy and Joining Science

1) New THz microscopy

Terahertz wave (wavelength: 10 μm ～ 50 μm) contains many important spectra of matters due to molecular/lattice vibration and biomolecular motion. We develop a novel near-field microscope, which “passively (without external illumination)” probes spontaneous THz photons derived from local phenomena with “20 nm” resolution.

2) Metal/polymer direct joining

After the melted plastic flows onto the nano-structured metal surface, the metal and polymer strongly join without adhesives. Optimizing the joining conditions and revealing the joining mechanism are the most important factors for industry use, and we now promote various studies to tackle the issues.

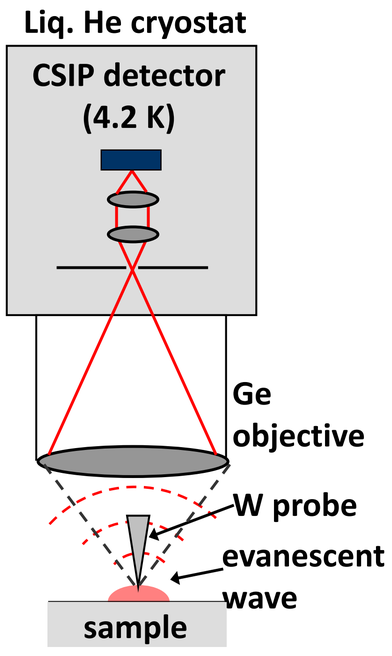


Fig. 1 Passive THz SNOM

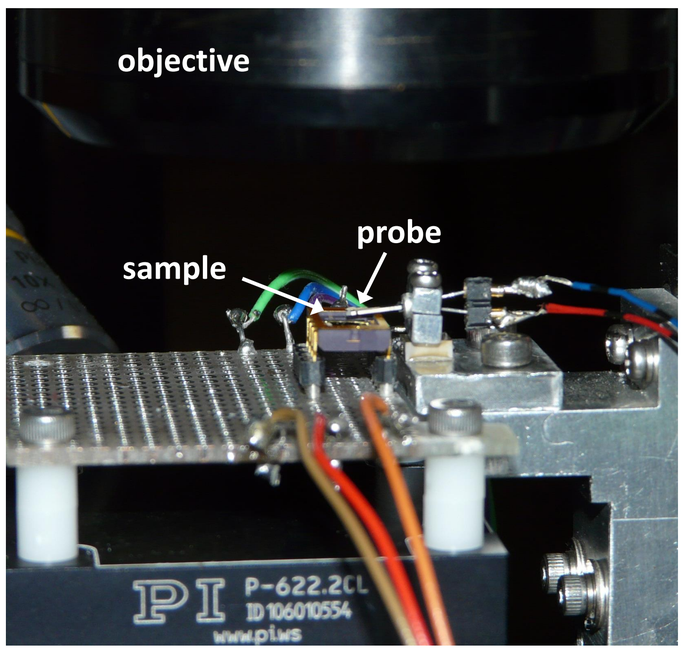


Fig. 2 Zoom-up around a sample and a tip

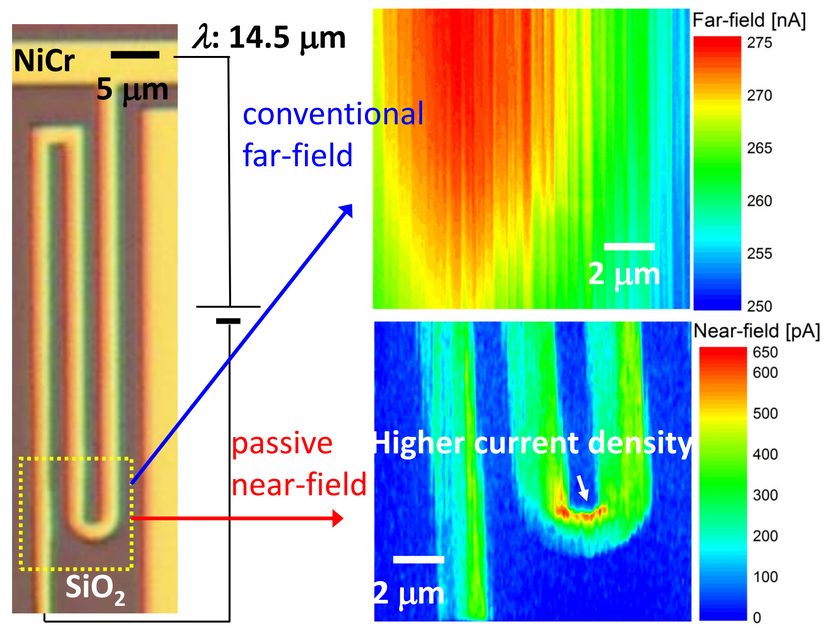


Fig. 3 Observation of nanoscale temperature distribution

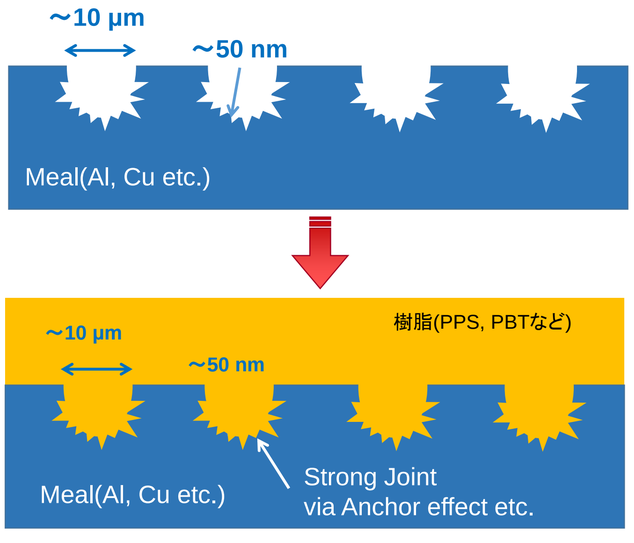


Fig. 4 Metal/polymer direct joining

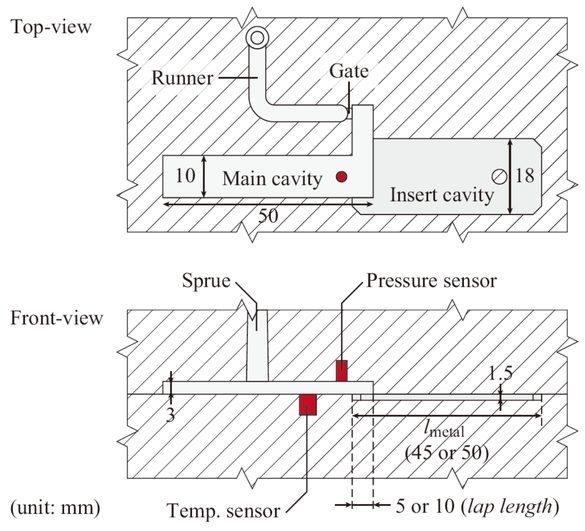
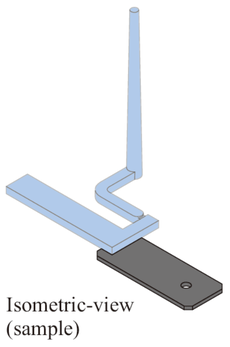


Fig. 5 Mold for direct joining



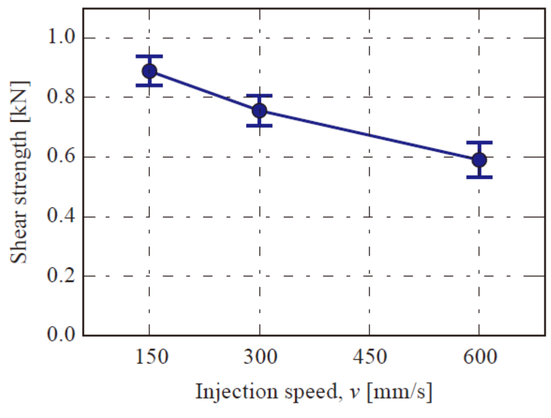


Fig. 6 Injection speed vs. joining strength