

KAJIHARA LAB.

Manufacturing and measurement via surface and interface



Department of Mechanical and Biofunctional Systems

Manufacturing Science Fundamentals

Department of Precision Engineering, Graduate School of Engineering

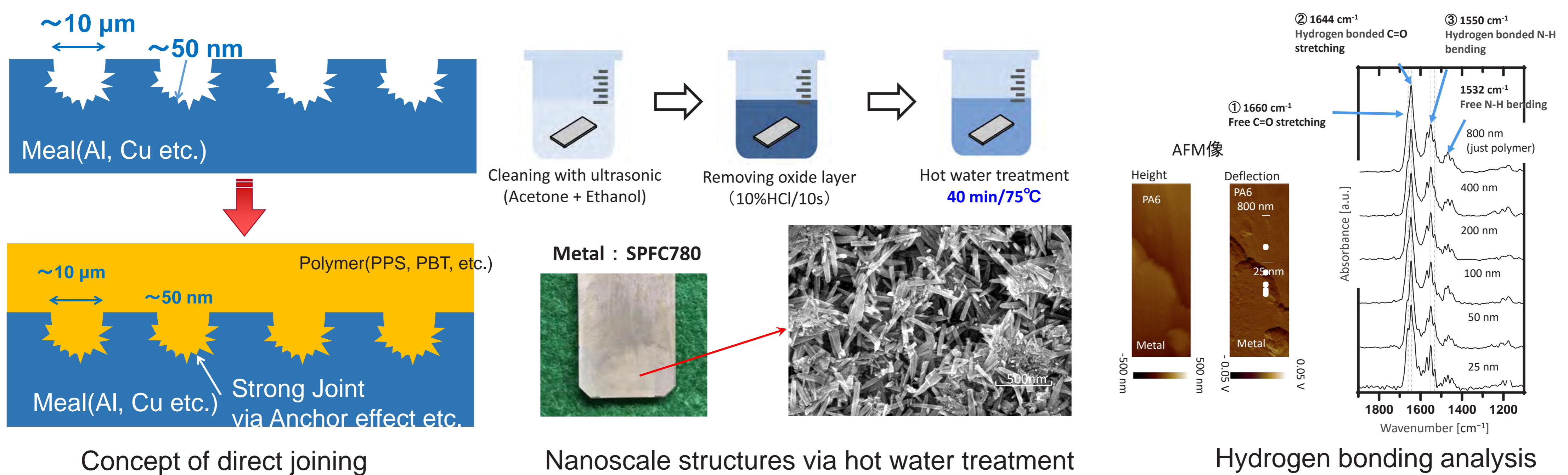
<http://www.snom.iis.u-tokyo.ac.jp>

Metal-polymer direct joining

Micro/nanostructures on metal surfaces yield strong joints with plastics.

Applications are promoted via optimization of joining conditions and elucidation of mechanisms.

⇒ Car interiors and bodies, mobile phones, fuel cell encapsulation, semiconductor devices, etc.



Concept of direct joining

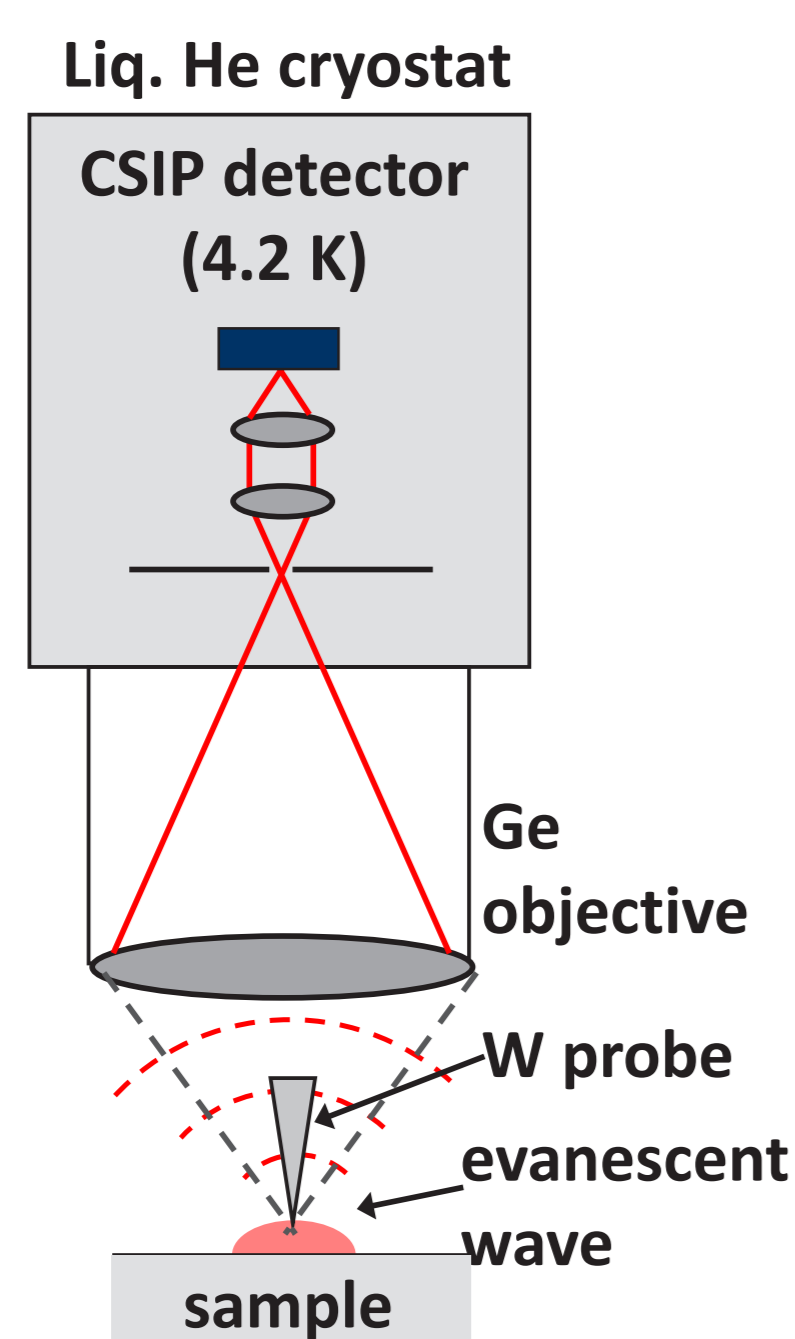
Nanoscale structures via hot water treatment

Hydrogen bonding analysis

Terahertz nanocscopy

Terahertz waves (wavelength 10-20 μm) emitted by materials themselves due to molecular vibrations or biological activities are detected passively with nanoscale resolution.

⇒ Nanothermometry (lattice and electron temperature), energy dissipation on nano-ICs, etc.



Passive THz SNOM

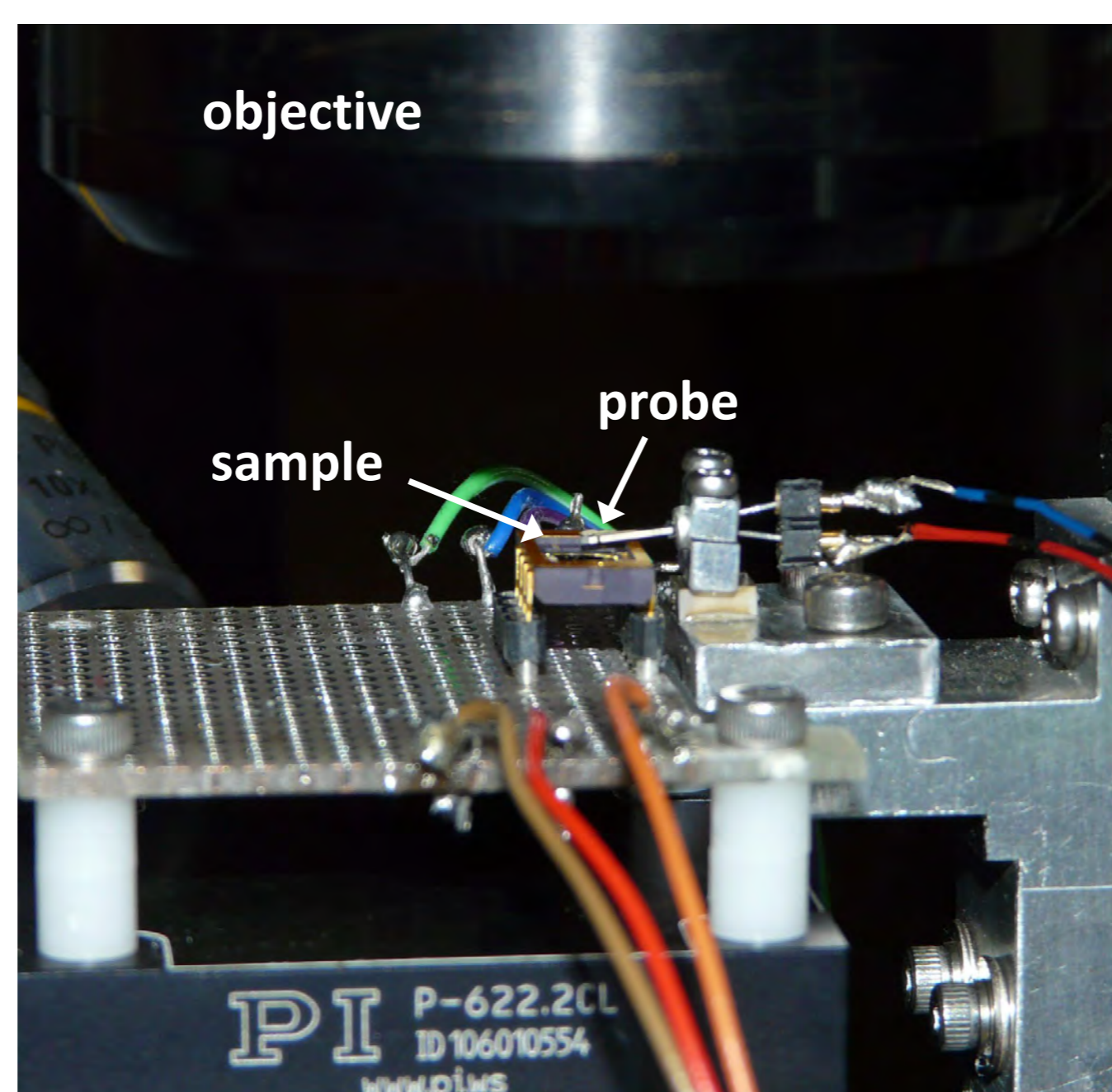
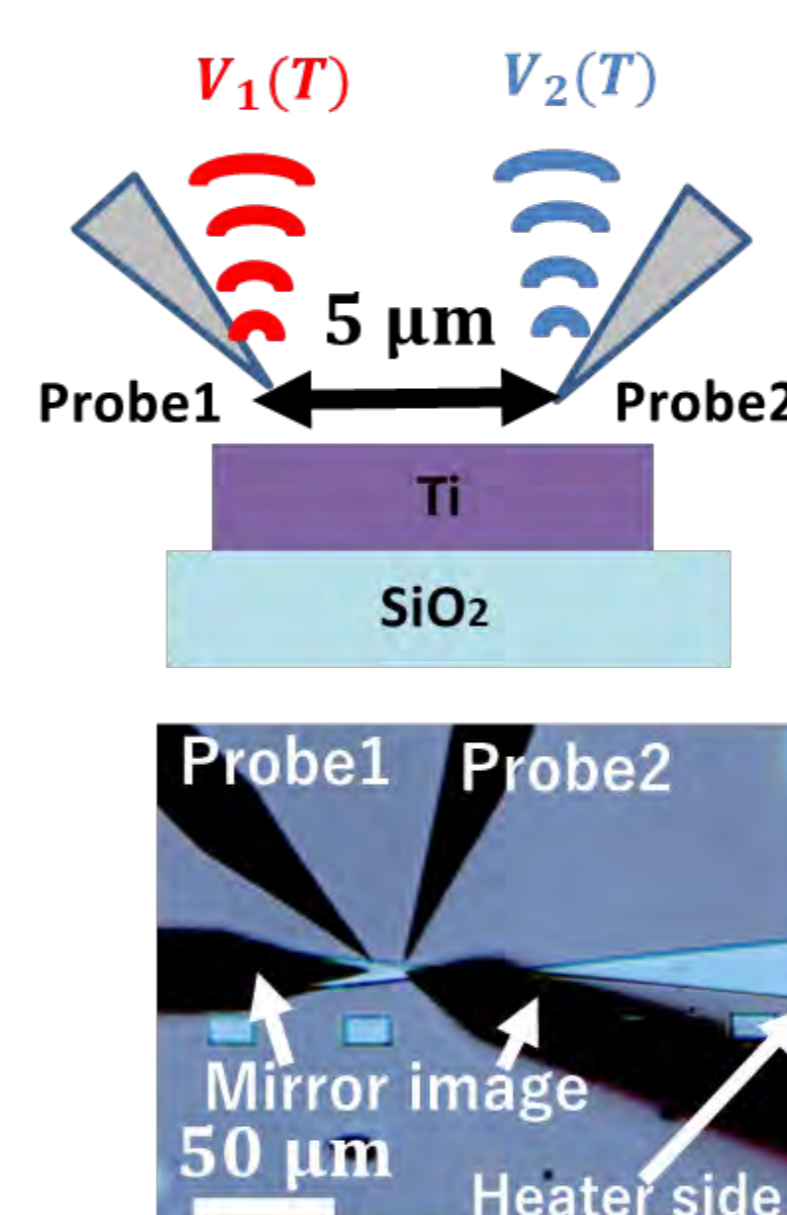
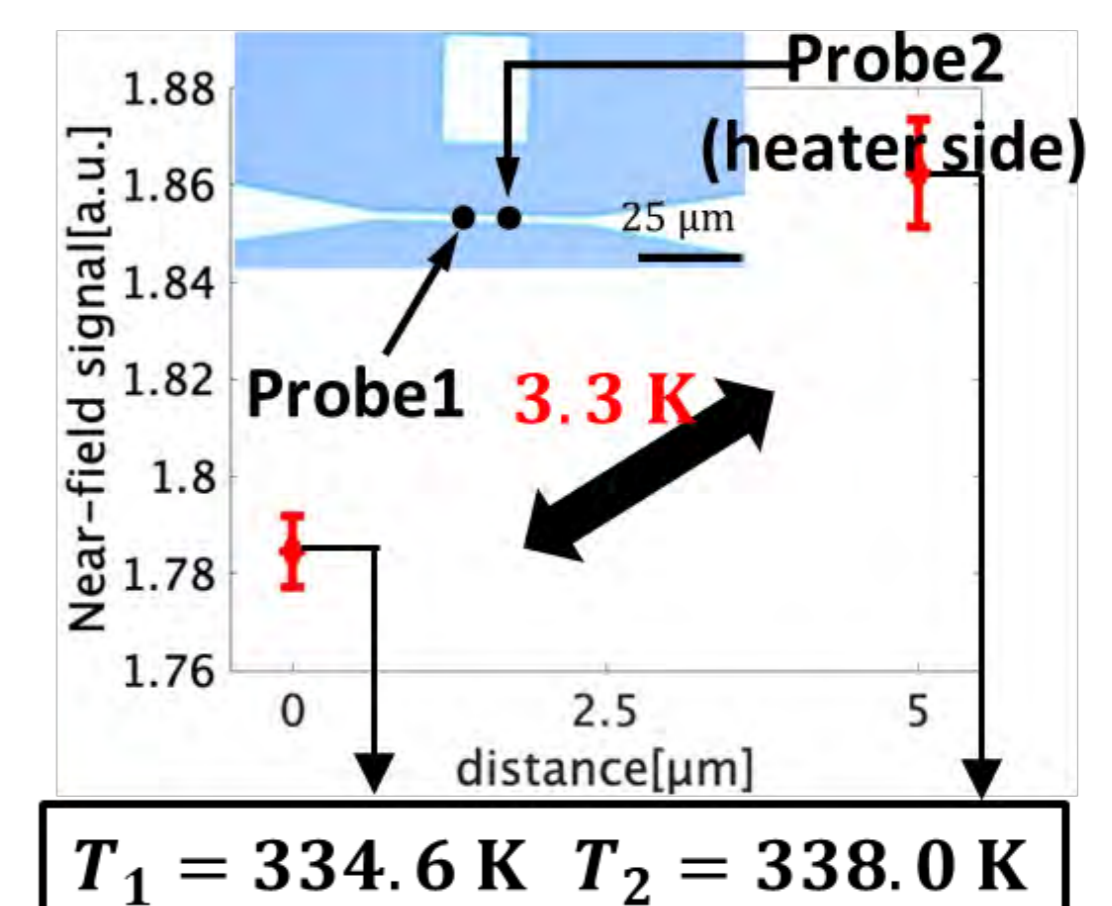


Photo around a sample



Observation of nanoscale heat transfer with two probes



プローブ間の熱移動量

$$Q = 49 \times 10^{-9} \text{ J}$$