High sensitivity organic temperature sensor
Research student: Xiaochen Ren

Background and objectives
Temperature sensor is one of the key components in artificial skin. The dynamic range of temperature sensor is low.

Dynamic range: <2x2=2 bit

Polyvinylpyrrolidone (PVPy) based organic thin film transistor

Charaterization of spin coated PVPy thin film
Surface morphology and dielectric property

Capacitance loss during the heating

Temperature sensor performance

Organic integrated temperature sensor
Device structure, one thermistor one transistor sensor

Conclusion
PVPy can be use as a polymer dielectric for organic thin film transistor due to its high dielectric constant and smooth surface. The PVPy based 1R1T temperature sensor shows the sensing dynamic range can be up to 10 bits. During the measurements, heating leads to the loss of capacitance in the dielectric and therefore the operating voltage increases. The high dynamic range temperature sensor provide high resolution sensing ability which is capable for artificial skin application and the simple fabrication process could be potentially used for flexible and large area devices.

References