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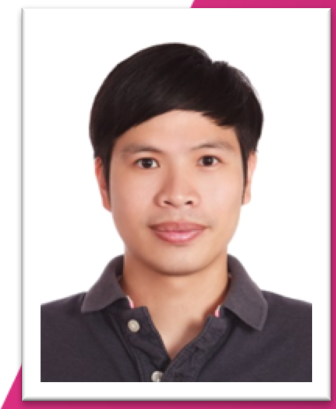
Intrinsically Stretchable and Healable Semiconducting Polymer for Skin-Inspired Wearable Organic Transistors



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平成 28 年 11 月 28 日（月）15:30~16:30
北海道大学 工学部 材料化学棟 MC102

Current molecular design rules for high charge carrier mobility semiconducting polymers are unable to render the fabricated devices simultaneously stretchable and mechanically robust. In this talk, we would like to present a new design concept to address the above challenge, while maintaining excellent electronic performance. This concept involves introducing chemical moieties to promote dynamic non-covalent crosslinking of the conjugated polymers. These non-covalent covalent crosslinking moieties are able to undergo an energy dissipation mechanism through breakage of bonds when strain is applied, while retaining its high charge transport ability. As a result, our polymer is able to recover its high mobility performance (> 1cm^2/Vs) even after 100 cycles at 100% applied strain. Furthermore, we observed that the polymer can be efficiently repaired and/or healed with a simple heat and solvent treatment. These improved mechanical properties of our fabricated stretchable semiconductor enabled us to fabricate highly stretchable and high performance wearable organic transistors.

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