Team develops new semiconducting polymer for forthcoming flexible electronics

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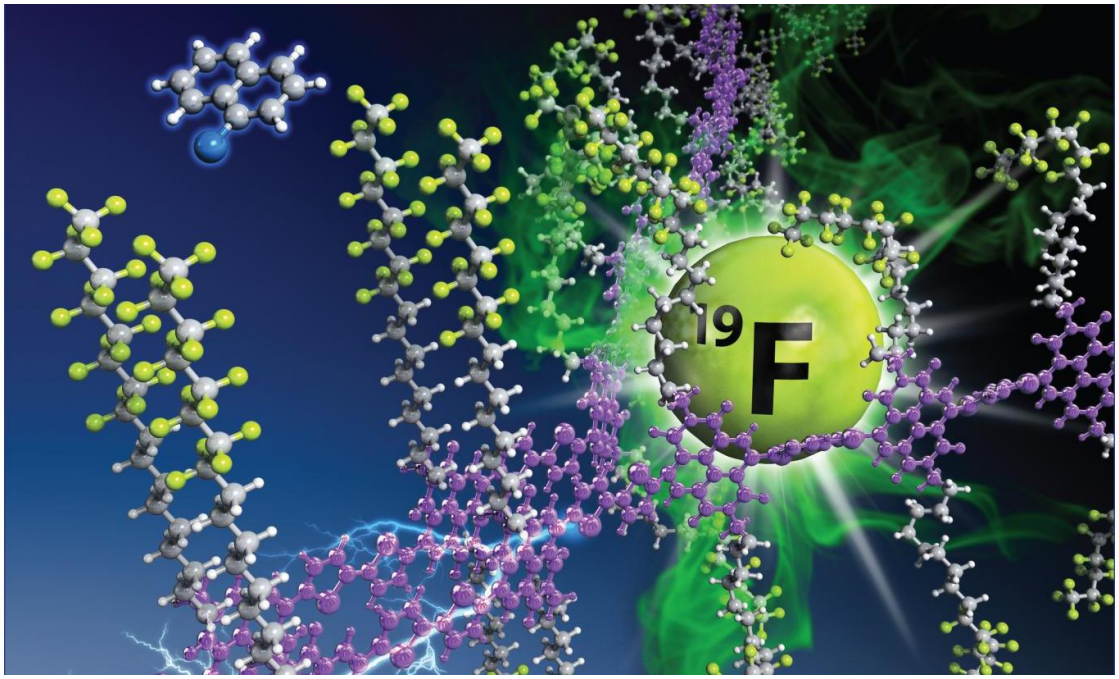

Kilwon Cho and the team's research was published in *Journal of the American Chemical Society* as a cover article and highlighted by the editors in *JACS Spotlights*. Credit: *Journal of American Chemical Society*

Polymer semiconductors, which can be processed on large-area and mechanically flexible substrates with low cost, are considered as one of the main components for future plastic electronics. However, they, especially n-type semiconducting polymers, currently lag behind

inorganic counterparts in the charge carrier mobility - which characterizes how quickly charge carriers (electron) can move inside a semiconductor - and the chemical stability in ambient air.

Recently, a joint research team, consisting of Prof. Kilwon Cho and Dr. Boseok Kang with Pohang University of Science and Technology, and Prof. Yun-Hi Kim and Dr. Ran Kim with Gyungsang National University, has developed a new n-type semiconducting polymer with superior electron mobility and oxidative stability. The research outcome was published in *Journal of the American Chemical Society* (*JACS*) as a cover article and highlighted by the editors in *JACS Spotlights*.

The team modified a n-type conjugated polymer with semi-fluoroalkyl side chains - which are found to have several unique properties, such as hydrophobicity, rigidity, thermal stability, chemical and oxidative resistance, and the ability to self-organize. As a result, the modified polymer was shown to form a superstructure composed of polymer backbone crystals and side-chain crystals, resulting in a high degree of semicrystalline order. The team explained this phenomenon is attributed to the strong self-organization of the side chains and significantly boosts charge transport in polymer semiconductors.

Prof. Cho emphasized "We investigated the effects of semi-fluoroalkyl side chains of conjugated polymers at the molecular level and suggested a new strategy to design highly-performing polymeric materials for next-generation plastic electronics".

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