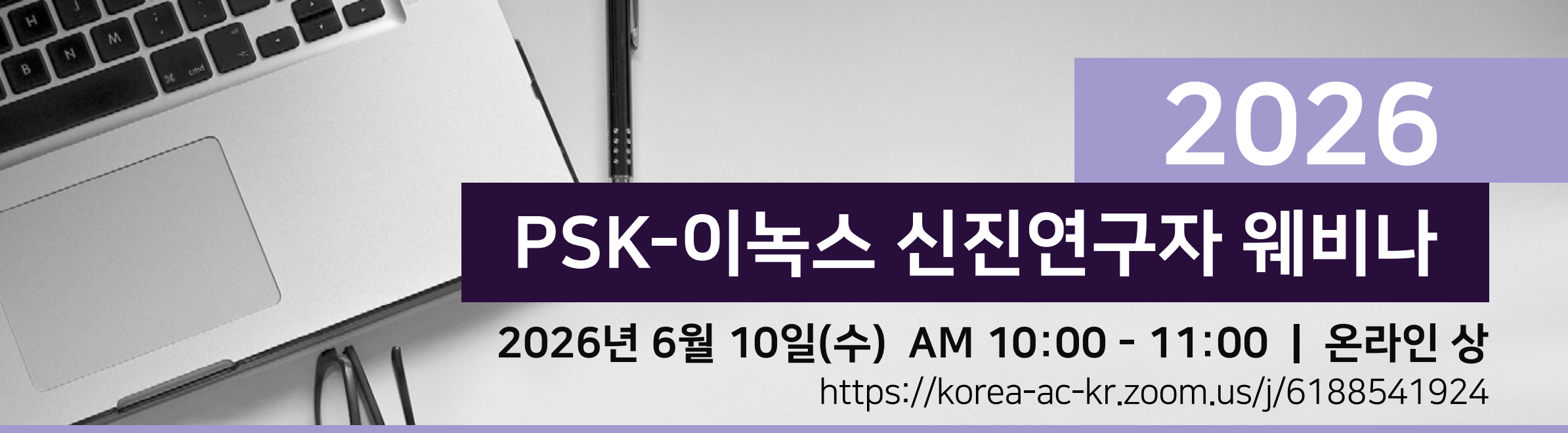

2026 PSK-이녹스 신진연구자 웨비나

2026년 6월 10일(수) AM 10:00 - 11:00 | 온라인 상

https://korea-ac-kr.zoom.us/j/6188541924

주최 한국고분자학회 주관 분자전자 부문위원회 후원 INNOX

○ 초대의 글

'PSK-이녹스 신진연구자 웨비나'는 우수한 연구역량을 가진 신진연구자를 발굴하여 교류의 장을 넓히고자 (주)이녹스의 후원과 한국고분자학회 주최로 마련한 온라인 세미나입니다. 이번 세미나에서는 고분자 분야 중에서도 특히 분자전자 소재 및 소자를 이용하여 선도연구를 수행하는 신진연구자의 우수한 연구성과를 공유하는 자리를 마련하였으니 관심있는 분들의 많은 참여 부탁드립니다.

○ 일정

AM 10:00 - 11:00	Quantifying the charge localization in molecular doping of conjugated polymers Sung-Joo Kwon(권성주), sjkwon12@uw.edu University of Washington

ABSTRACT: Doping of conjugated polymers is widely studied for both fundamental and practical applications. Tailoring the electrical properties of conjugated polymers via molecular doping is well established. However, quantifying number of charges per dopant, and the ratio of delocalized charges, to localized charges remains a challenge.

First, we quantify the generated charge density of molecularly doped conjugated polymer. Specifically, we investigate the molecular doping in two conjugated polymers with very different reported doping efficiencies using functional atomic force microscopy methods. We create calibration curves that correlate optical bleaching and charge density upon spectroelectrochemistry, and subsequently determine the charge density of molecularly doped conjugated polymers. We further use scanning Kelvin probe microscopy and conductive AFM to investigate local doping and visualize the morphology dependence of local dopant/counterion accumulation.

Next, we quantify degree of charge localization in molecularly doped conjugated polymers. we quantify the mobile and localized charge concentrations in molecularly doped conjugated polymers using the above spectroelectrochemical calibration, which we cross-validate by applying X-ray photoemission, spectroscopy and Hall effect measurements and by fitting to established transport models (semi-localized transport, SLoT). By combining SLoT model with Fermi level measurement obtained from scanning Kelvin probe microscopy, we extract the depth of potential well. These results show distinct differences of potential well, consistent with the contrast transport trends between the polymers studied here.

Lastly, we investigate the role of side chain chemistry in charge transport of molecularly doped conjugated polymers. We plot the mobility as a function of charge density of molecularly doped conjugated polymers and decouple the respective influences of alkoxy attachment and ethylene glycol side chain on charge transport. Transient absorption spectroscopy and grazing incidence wide-angle X-ray scattering results show that ethylene glycol side chain alone does not alter the polaron decay relevant to the macroscopic transport, while morphological features dominate the macroscopic transport.

These studies provide a straightforward and robust platform for quantifying charge localization, while establishing a clear framework that links side-chain chemistry to charge transport in molecularly doped conjugated polymers.

한국고분자학회
The Polymer Society of Korea