



IBS Center for Molecular Spectroscopy and Dynamics

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## COLLOQUIUM

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- **SPEAKER**

Dr. Myeongkee Park (Department of Chemistry, University of California, Berkeley)

- **TITLE**

Femtosecond Stimulated Raman Spectroscopy (FSRS) and Methylammonium lead iodide (MAPbI<sub>3</sub>) Photochemistry

- **ABSTRACT**

(1) Femtosecond stimulated Raman spectroscopy; Excited-state dynamics accompanied with ultrafast molecular structural changes can be measured by femtosecond stimulated Raman spectroscopy (FSRS). This unique method requires femtosecond actinic pump, probe pulses, and picosecond Raman pump. In particular, it is very critical to generate spectrally narrower (temporally broader) Raman pump pulses from a femtosecond laser in order to obtain higher quality FSRS. Herein, two different Raman pump generation methods (grating/slit and etalon filter) will be presented, and their lowest Raman frequency detection limits will also be discussed.

(2) MAPbI<sub>3</sub> perovskite photochemistry; There has been tremendous interest in how methylammonium lead iodide (MAPbI<sub>3</sub>) perovskite achieves high photovoltaic efficiency as a future promising solar cell. Many of studies, particularly, has been tried to understand flexible MA ion's roles in the inorganic Pb-I framework, e.g. MA-induced polaron-screening and transient Rashba splitting effects. Recently, we have experimentally found mechanistic findings for MA's role by employing Raman & photoluminescence microscopy, femtosecond time-resolved spectroscopy, and first-principle density functional theory. Our results suggest that (1) MA's dipole orientation changes induce distortions of the Pb-I framework via hydrogen-bonding strength changes between hydrogens of MA and an iodine atom, and (2) excited-state coherent phonon modes of the Pb-I framework are correlated with a distorted Pb-I structure induced by an isolated polaron.

- **DATE AND VENUE**

June 28, 2017 (Wednesday, 5:00 - 6:00 p.m.) /Seminar Room 116, KU R&D Center

- **LANGUAGE**

Korean/ English

- **INVITED BY**

Dr. Bonghwan Chon

\* If you want to discuss with Dr. Myeongkee Park (from 3 to 4:30 pm), please contact to Dr. Bonghwan Chon (bonghwan.chon@gmail.com).