



Division of Physical Chemistry
American Chemical Society

Light-Matter Interactions in Molecular Systems and Emerging Semiconductors

Daniel Congreve, Sascha Feldmann,
Lea Nienhaus, *Organizers*

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Room 32B

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SUNDAY MORNING

Photophysics of Molecular Systems

D. M. Arias-Rotondo, *Presiding*

8:15 AM. Opening Remarks.

8:20 AM. Translating intrinsic molecular photophysical properties to bright fluorescent materials by supramolecular organization and doping. **B. Laursen**

8:55 AM. Towards the synthesis of photon upconversion materials using small-molecule, ionic isolation lattices (SMILES). **A.H. Flood**

9:15 AM. Break.

9:30 AM. Photoactive complexes of manganese in low oxidation states. **D. Arias-Rotondo**

10:00 AM. Understanding the role of light in photoredox reactions. **J. Swierk**

10:30 AM. Break.

10:45 AM. Measuring the total photon economy of molecular species through fluorescent optical cycling. A.V. Sica, **A.S. Hua**, B. Coffey, K.P. Anderson, L.A. Coffey, B.T. Nguyen, J.R. Caram, A.M. Spokoyny

11:00 AM. Ultrafast dynamics of multifunctional photoswitches modulated by solution composition. **D. Hayes**, D.J. Jacoby, S.M. Tian

11:30 AM. Steric and electronic influence of excited state decay in Cu(I) MLCT chromophores. **F.N. Castellano**

SUNDAY AFTERNOON

All Things Triplets: Upconversion, Downconversion and Phosphorescence

L. Nienhaus, *Presiding*

2:00 PM. Identifying and addressing surface defects in silicon nanocrystals that limit energy transfer. **M.L. Tang**

2:30 PM. Directing energy transfer pathways in halide perovskite

glassy polymers. **X. Hu**, L. Pollice, A. Ronchi, M. Roccanova, M. Mauri, D. Lardani, D. Vanhecke, A. Monguzzi, C. Weder

3:15 PM. Break.

3:30 PM. Probing charge transfer in emerging materials for solar energy applications. **M. Capobianco**

3:50 PM. Intuitive and computational approaches for generating new materials for efficient triplet-triplet annihilation upconversion.

J. Isokuortti, C. O'Dea, J. Sowa, S. Allen, P.J. Rossy, Z. Page, S.T. Roberts

4:10 PM. Molecular Design Strategies for Phosphorescent OLED Devices: an Azaphenanthridinebenzimidazole (APBI) Stability Study. **J. Macor**

4:40 PM. Break.

5:00 PM. New chromophore materials for photon upconversion. **N. Yanai**

5:30 PM. Molecules in the sun: Using singlet fission to boost silicon photovoltaics. **M. Tayebjee**, T. Schmidt, N. Ekins-Daukes, D. McCamey, J. Jiang, B. Hoex, A. Ciesla, M. Nielsen, P. Pearce, J. Beves, N. Chang, Y. Cho, J. Tong, S. McNab, B. Carwithen, M. Brett, A. Baldacchino, A. Mo, Z. Qiao, V. Zhang, M. Kavungathodi

MONDAY MORNING

Nanocrystals

K. E. Shulenberger, *Presiding*

8:00 AM. Understanding luminescence mechanisms in DNA-stabilized silver nanoclusters. A. Gonzalez Rosell, R. GUHA, **S.M. Copp**

8:20 AM. Taking inspiration from molecular photochemistry for quantum dots: A conical intersection picture. **C. Hetherington**, B.G. Levine

8:35 AM. Comparative analysis of synthesis techniques of MoS₂ Quantum Dots for use in solar cells. **L. Sullivan**, M. Capobianco

9:35 AM. Synthesis and excited state properties of heavy-metal free iron sulfide nanocrystals. **K.E. Shulenberger**, S. Tenney, H. Moon

10:05 AM. Photonic design for optical cooling with perovskite nanocrystals. **M.T. Sheldon**

10:25 AM. Break.

10:45 AM. Engineering perovskite nanocrystals as versatile quantum emitters. **M. Kovalenko**

11:15 AM. Blinking and bleaching dynamics of mixed halide perovskite quantum dots synthesized with various ligands and their impact on light emitting diode performance. **D. Athapaththu**, J. Chen

11:30 AM. Deterministic halide perovskite quantum light sources with engineered light-matter interactions. **F. Niroui**

MONDAY AFTERNOON

Increasing the Dimensionality: Aggregates, 2D and Bulk Materials

D. Congreve, *Presiding*

2:00 PM. Dimensionality control and dynamic dimers in coordination energy materials. **M. Freitag**

2:30 PM. Structure, spectroscopy and transport in tubular and 2D excitonic molecular aggregates. **J.R. Caram**

3:00 PM. Revealing the mixtures of molecular aggregates during thin film annealing using exciton dynamics. **C.Y. Wong**

3:30 PM Break.

3:45 PM. Bright and fast emission from robust supramolecular J-aggregate nanostructures through silica-encapsulation.

D.H. Thanippuli Arachchi, U. Barotov, C. Perkinson, T. Sverko, A. Kaplan, S. Elder, M.G. Bawendi

4:00 PM. Static and light induced dynamic lattice characteristics in TMDC bilayers. **F. Liu**

4:30 PM. Break.

4:40 PM. Organo-chalcogenide halide perovskites. J. Li, S. Saha,

TUESDAY MORNING
**Strong Light-Matter Interactions and Advanced
Characterization Methods**

N. Yanai, *Presiding*

8:00 AM. Light-harvesting semiconductor metasurfaces for the enhancement of photocatalytic activity. **M. Sfeir**, Y. Paudel, A. Korylenko

8:30 AM. Active tuning of polariton coupling strength by spectroelectrochemistry. **N. Sinai**, C.Y. Lassalle, J.E. Kelm, S. Patel, S. Park, M. Tan, T.W. Odom, J.L. Dempsey

8:45 AM. Developing ab initio methods for polaritonic Chemistry in electronic Strong coupling regime. **R. Manderna**

9:00 AM. Break.

9:20 AM. Polaritonic motional narrowing at the strong light-matter coupling limit through a photonic exchange mechanism. **A. Rury**

9:40 AM. Simple and versatile platforms for manipulating light with matter: Strong light-matter coupling in fully solution-processed optical microcavities. **N. Stingelin**

10:10 AM. Break.

10:30 AM. Nanoscale electronic, thermal, and mass transport in emerging materials via far-field light-matter interactions. S. Sohoni, C. Huang, L. Hamerlynck, L. Belman-Wells, A. Maitra, S. Hart, H. Weaver, **N.S. Ginsberg**

11:00 AM. Visualizing light-induced electron-phonon and phonon-phonon interactions using ultrafast diffraction. **A. Sood**

11:30 AM. Photoemission electron microscopy for ferroelectric and antiferroelectric domain imaging. **S.B. King**

TUESDAY AFTERNOON

Spinning Around: Chirality and Spin

S. Feldmann, *Presiding*

2:00 PM. Applying chiral conjugated materials to circularly polarized optoelectronic devices: Challenges and opportunities. **M.J. Fuchter**

2:30 PM. New chiroptical materials engineering enabled by apparent circular dichroism. **R. Tempelaar**, A. Salij

3:00 PM. Understanding static and dynamic local structure: Metal Halide Perovskites. **M. Toney**

3:20 PM. Break.

3:40 PM. Superatom spin-vibronic interactions in gold nanoclusters studied using ultrafast and magneto-optical spectroscopy techniques. N. Smith, **K.L. Knappenberger**

4:00 PM. Real-time simulations of preferential spin transport in chiral materials due to the chiral induced spin selectivity effect. **X. Zheng**, S. Upadhyay, T. Wang, A. Shayit, m. yang, X. Li

4:20 PM. Controlling magnetic properties of molecules with quantum fields: ab-initio theoretical approaches for spin polaritonics. **E. Ronca**, A. Barlini, G. Thiam, B. Andrea, R. Rossi, L. Belpassi, H. Koch

4:40 PM. Light-induced exciton-4f spin interaction in hybrid perovskite semiconductors. **T. Xu**

5:00 PM. Break.

5:15 PM. Revealing the spin-orbit coupling in thermally assisted delayed fluorescence of carbene-metal-amides. **T. Nattikallungal**, C. Muniz, M.E. Thompson, S.E. Bradforth

5:30 PM. Understanding delocalization and dissociation of excitons in heterogeneous semiconductors from first principles computational modeling. **M.R. Filip**

