

# THE SALZBERG CHEMISTRY SEMINAR SERIES



The City College  
of New York



DEPARTMENT OF CHEMISTRY AND  
BIOCHEMISTRY – Fall '23

Monday, November 27, 2023 @ 12:00 noon – MR1027

## Click chemistry tailored benzimidazole functionalized triazole block-co-polymer for emergence of exotic chimaeric nano-crystalsomes

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**Abstract:** The fabrication of crystalline polymers is synthetically challenging and intellectually stimulating. Amphiphilic block copolymers self-assemble in water to form various vesicle-like architectures depicting curved interfaces, which are shape-translational symmetry incommensurate crystals and ubiquitous. Interestingly, the mechanical properties of the polymeric system improve by forming a crystalline structure. Herein, we for the first time, report the synthesis of a new click monomer (CM), (1-(2-(1H-benzo[d]imidazol-1-yl) ethyl)-1H-1,2,3-triazole-4-yl) methyl methacrylate via azide-alkyne cycloaddition 'Click reaction'. Furthermore, this monomer was co-polymerized with dimethyl aminopropyl methacrylamide (DMAPMA) via free radical aqueous co-polymerization to generate chimaeric crystalsomes (DPCM) through self-organization of polymeric subunits that structurally resemble classical polymersomes. In an aqueous system, amphiphilic block co-polymers organize within the enclosed membrane to form single crystalline chimaeric substructures. Transmission electron microscopy (TEM) and atomic force microscopy (AFM) have been employed to characterize and understand the nanocrystalline nature of DPCM. The single crystalline nature of these DPCM has been witnessed via X-ray diffraction (XRD) study, consistent with the selected area electron diffraction (SAED) pattern. In addition, the technologically advanced DPCM with nanometer dimensions possesses inherent bioactive properties from click monomeric units, exhibiting remarkable efficacy in conjunction with accelerated wound healing competence in rat model studies from a materiobiological frame of reference to hone significant development in this arena.

**Biography:** Prof. Monalisa Mukherjee completed her Bachelors and Master degree from the University of North Bengal, India. She received her PhD from Center for Biomedical engineering, IIT Delhi in 2006. Presently, she is serving as Director at Amity Institute of Click Chemistry Research and Studies (AICCRS) & Professor at Amity Institute of Biotechnology, Noida Campus, India. She is also a recipient of National scholarship award 1998, Young Scientist award 2010, UK-India Distinguished Visiting Scientist Award 2011. She has been admitted as a fellow of Royal Society of Chemistry (FRSC), London, UK, in 2021. During the past 5 years, Dr. Mukherjee has made exemplary contributions to the field of materiobiology. Her research is not only reinforced by her remarkable publications in high impact factor journals such as Journal of American Chemical Society, ACS Nano, Nano Today, Material Horizon, ACS Applied Materials and interface, ACS Sustainable Chemistry, ACS Applied Polymer Materials, Royal Society of Chemistry Biomaterial Science, Journal of Material Chemistry Part B, Biomaterial Advances, Biotechnology Advances, Green Chemistry and patents but also by the translational potential of her work. Till date she has completed 6 project and has 3 on-going projects. She has guided 7 PhD students and 15 M. Tech Students for their dissertation work. She is an editorial board member of chemistry and chemical biology division of Scientific Report Nature as well as Taylor and Francis Journal of Biocatalysis and Biotransformation. Recently she has joined as research task force member of chemical science domain of DST FIST. The executive council of Telangana University recommended to bestow upon her the title of honorary Professor at Telangana University.

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