PRSECREEENING OF RESISTS FOR EUVL FROM N7 DOWN TO N3 NODES BY EBL AND HIM

Kenneth E. Gonsalves[a#], Satinder K. Sharma[b#], Mohamad G. Moinuddin[b], Rudra Kumar[b], Manvendra Chauhan[b], Subrata Ghosh[a]
Indian Institute of Technology at Kamand
[a]School of Basic Sciences & [b]School of Electrical and Computer Engineering
Mandi HP 175005, India
[#]Kenneth@iitmandi.ac.in; [#]satinder@iitmandi.ac.in
www.photoresistgroup.com

Convergent as well as divergent materials design and chemistries have been developed by us for preparing various resist formulations from CARs to non-CARs as well as MOFs, organometallics, organic-inorganic hybrids and activated NP monolayers in an attempt to meet the stringent requirements for EUVL, the all encompassing RLS. Extensive materials characterizations of these resists pre-exposure, are critical and will be discussed along with some photodynamic mechanistic insights. Since EUV photons are still scarce, protocols based on readily available ebl, HIM tools and FESEM/AFM for metrology have been developed in-house for screening the resists for sensitivity, CD, LER/LWR. Patterns with half pitch down to sub 12 nm have been obtained as well as isolated lines of the order of 7 nm. Complex patterns will also be presented. Subsequent EUV exposures are anticipated for calibrating optimum prescreened resists as potential prototypes for fab. The state-of-the-art clean synthesis labs, materials characterization facilities at AMRC, class 100 clean room at C4FED with all relevant major tools ebl, HIM, FESEM, AFM, etch etc are available onsite. International collaborations, particularly with Prof. Weibel, UFRGS & synchrotron Campinas Brazil for EUV photodynamics mechanism studies are ongoing.

Kenneth E. Gonsalves is Visiting Distinguished Professor at IIT Mandi since Jan 2012 to the present. Prior to that he was the Celanese Acetate Distinguished Professor of Polymer Science at UNC Charlotte, North Carolina USA. He also served as Associate Director S&T oversight for Americas, Office of Naval Research Global from 2009 to 2011. He is the author and or editor of over 300 publications, several books and numerous patents primarily in resist technology. His projects have been funded by NSF, DARPA, DoD, ACS, NCBC and several industry related to resist technology, Intel, Rohm and Haas/Du Pont amongst others. Projects for advanced resists have also been funded by DST, MHRD as well as industry in India. His interests, besides nanoscale resists for NGL, include nanoscale drug delivery focusing on antibiotics, tissue engineering at the nanomicro- scale and organometallic precursors for ceramics. IP and scaleup of advanced resist formulations are anticipated under the TSDP DST commercialization initiatives in linkage with industry.