Request for Interest from entities regarding commercialization of new and novel families of organic ligands and their molecular catalysts

June 29, 2017

Los Alamos National Security, LLC (LANS) is the manager and operator of Los Alamos National Laboratory (Los Alamos) for the U.S. Department of Energy National Nuclear Security Administration under contract DE-AC52-06NA25396. Los Alamos is a mission-centric Federally Funded Research and Development Center focused on solving critical national security challenges through science and engineering for both government and private customers. LANS is issuing this Request for Interest (RFI) to aggregate recommendations for commercialization strategies for novel catalysts based on polydentate and macrocyclic ligands.
Request for Interest (RFI)

The Los Alamos National Laboratory is formulating an extended commercialization strategy for catalysis chemistry R&D, intending to identify collaborative research partner(s) for research and development, including scale-up and production beyond kg levels (≥ 100 kg). Partners considered most suitable include fine chemical or pharmaceutical manufacturers worldwide, and the purpose of this RFI is to fairly understand any and all alternatives to speed up the commercialization of the LANL technologies, described below. The Laboratory is requesting a response to this RFI using the submission template described below, to allow parties to express interest in participating in collaborations with LANL scientists engaged in catalysis research. The expectation is that a 2-3 page Letter of Interest (LOI), also called the “Whitepaper”, along with a completed Company Questionnaire and a 1-2 page Tech-to-Market (T2M) plan will be sufficient for parties to indicate their interest and address specific topics. Requests for technical details beyond those outlined below should be sent to Dr. Pavel Dub pdub@lanl.gov and Dr. John Gordon jgordon@lanl.gov. Requests for proprietary Q&A will be handled on a case-by-case basis, and should be tendered via the requestor’s legal counsel to Laboratory counsel, Mr. Bruce Cottrell, bcottrell@lanl.gov.

Call: Responses to this RFI should be received in Los Alamos by 5:00 pm Mountain Time, no later than Aug. 16, 2017

Background on Catalysis Chemistry at Los Alamos

Progress in homogeneous catalysis including homogeneous hydrogenation often involves the development of novel ligands and their transition-metal complexes that are active pre-catalysts or catalysts. The vast majority of ligands used in homogeneous catalysis are based on P and/or N donor atoms and an enormous number of such bi-, tri- and tetradentate ligands have been designed and synthesized over the past half century. Polydentate chelating ligands bearing N-H functionalities play a crucial role in bifunctional molecular catalysis, in which the ligand facilitates the catalytic reaction via stabilization of rate-determining transition states through N–H···O hydrogen bonding interactions and/or an N–H bond cleavage/formation, respectively. Bifunctional molecular catalysis based on metal–ligand M/NH cooperation was originally developed for asymmetric hydrogenation (e.g. Noyori asymmetric hydrogenation) and transfer hydrogenation of ketones and imines and is now applicable to variety of chemical transformations with a wide scope and high degree of practicability. They include practical hydrogenation of carboxylic and carbonic acid derivatives, hydrogenation and electroreduction of CO2, methanol economy related chemistry (transformation of CO2 into methanol), various acceptorless dehydrogenations, asymmetric Michael reaction of 1,3-dicarbonyl compounds with cyclic enones and nitroalkenes, stereoselective catalytic C–N and C–C bond-forming reactions, aerobic oxidative kinetic resolution of racemic secondary alcohols, asymmetric hydration of nitriles, alkylation of amines and others.

Tridentate and Tetradentate Macrocyclic Ligands. We have recently developed four new and novel families of ligands, and their derived molecular catalysts, in particular for the chemical reduction of carbon–oxygen bonds in both renewable and oil-based feedstocks:
These new LANL ligands and their derived catalysts offer a number of advantages in terms of their cost, synthetic accessibility, scalability, practical application and intellectual novelty. Turnover numbers > 100 000 were achieved for selected catalyst/substrate combinations under mild reaction conditions.

Computational and Synthetic Capabilities At LANL We are very well equipped with synthetic laboratory space, equipment for characterization of molecular structure and reactivity, as well as high level computational capabilities that can be used to probe catalytic pathways.

LANS Intellectual Property


Please note that the U.S. Government retains a worldwide, royalty-free, non-exclusive right to practice any LANS-owned patents and/or copyrighted software. Accordingly, any entity will have open access to LANS patents and copyrights in performance of a Government contract.
Submitting A Letter of Interest

This RFI is made without prejudice to any form of collaborative arrangement, alliance, or number of entities. Ability and willingness to ensure compliance with U.S. Export Control law, and qualifications to enter into a Cooperative Research and Development Agreement (CRADA) are requirements. Please submit a written response on how your organization envisions utilizing LANL’s Catalysis Chemistry capability, with explicit discussion of the topics listed above. The response may also include a business or product plan, a business model, or any other relevant information. Please properly mark any information that is considered proprietary or business-sensitive. LANS will supply a Nondisclosure Agreement to any U.S. company or person requiring it. Those companies interested in pursuing this opportunity should direct a Letter of Interest, as well as any comments or questions, to rossm@lanl.gov before 5:00pm MST by August 16, 2017.

Template Format

Letters of interest (LOIs) can to be 2-3 page whitepapers, and should be no longer than 10 pages. Latitude for a whitepaper’s organization is granted to allow for the expression of innovative ideas, to be made within the nominal constraints of single-spaced lines, 12-point font, and 1-inch margins.

The submission package should also consist of the following:

1. Company Questionnaire: contains contact information and basic company information.
2. T2M plan: A Tech-to Market plan addressing commercialization focus and timelines.
3. LOI: What is the statement of interest? How will the proposed alliance benefit both organizations? What is the proposers track-record for commercialization of technologies from Universities/National Laboratories? What criteria for investment and investment potential will be proposed to support the statement of interest?

Los Alamos Business Development Contacts

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