

Fiscal Year 2015 Tokyo Institute of Technology ASPIRE League Research Grant

Selected Research Projects for Type 2 in FY2015

Principal Researcher	Name	<b>Shinji Ando</b>
	Department and graduate school(institute) in Tokyo Tech	Department of Chemistry and Materials Science, Graduate School of Science and Technology
	Position	Professor
Co-researchers	HKUST	—
	KAIST	Myungeun SEO, Assistant Professor Graduate School of Nanoscience and Technology
	NTU	Xiao HU, Professor School of Materials Science & Engineering
	Tsinghua	Xiaogong WANG, Professor Chemical Engineering / Institute of Polymer Science & Engineering
Subject of the research project		Building of polymer nanomaterial network among four ASPIRE universities
Summary of the research project		The creation of 'polymer nanomaterials' is regarded as not only control of the molecular structure of polymeric substance at the nano level but also as a novel material technology which controls the higher-order structure, hierarchical structure, and aggregation structure of polymer complexes, followed by the development of new materials exhibiting desired physical properties. In particular, "polymeric/inorganic nanohybrid technology" consisting of nanoparticles of metals, metaloxides, and/or carbons (such as graphene) dispersed in polymeric matrix and "self-organized and well-ordered functional nanoporous technology" by a combination of block copolymers with precisely controlled chain sequence and molecular weight and additional functional components are considered to be the most promising polymeric nanomaterials technologies. In this proposal, we will

	<p>create and develop novel nanohybrid and nanoporous materials exhibiting outstanding optical, electrical, and thermal functionalities through the international collaborative investigations among the four research groups from ASPIRE universities. We also aim to foster and cultivate an ‘Asian polymer nanotechnology network’ including graduate students and young researchers from the member universities. Concretely, we will try to develop innovative polymer nanomaterials, whose higher-order, hierarchical, and aggregation structures are well controlled by using polyimides or polymer matrices including imide components as the matrices because the heat-resistance and the mechanical toughness, which are the weak points of polymers, can be made up, and the flexibility, the light weight and the cost performance will be well utilized. In addition, the optical, electrical, and thermal functionalities will be imparted by incorporation of metals, metaloxides, and/or carbon nanoparticles and thermally degradable components which can be converted to nanopores or inorganic nanoparticles</p>
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