

Fiscal Year 2011, Tokyo Institute of Technology ASPIRE League Research Grant

Selected Research Projects in FY2011

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	Position	Associate Professor
Co-researchers	HKUST	-
	KAIST	-
	Nanyang	Wun Jern Ng, Prof. Division of Environmental & Water Resources Engineering
	Tsinghua	Xinhui Xing, Prof. Department of Chemical Engineering
Subject of the research project		<b>Development of an Integrated Biological -Chemical Wastewater Treatment Technology</b>
Summary of the research project		<p>Wastewater from coal gasification includes potentially inhibitory and persistent organic compounds such as the phenolics and PAHs, ammonia, cyanide, and metals. Thereby this wastewater can become a serious environmental problem in coal-based developing countries.</p> <p>Our joint project proposal combines the efforts of researchers from Japan, China, and Singapore with the aim of developing an earth-friendly biological (microbial) wastewater treatment process for coal gasification power generation. The team does, however, recognize the difficult nature of the wastewater selected and so also proposes to combine the biological process with chemical processes for polishing and resource recovery. The project proposers argue it is important to have an energy efficient biological process and so are considering an anaerobic (or other reducing environment bioprocess). The anaerobic process will also afford the opportunity to recover energy. Combining the anaerobic with the aerobic process results in an alternating</p>

	<p>reducing-oxidizing condition, which is anticipated to allow for degradation of a broader range of organic compounds. The project proposers anticipate this shall possibly lead to the development of a novel biotreatment technology. Additional resource recovery (in addition to the energy) may be possible with the subsequent chemical process and metals as a likely target. Excess biomass accumulated in the biological system shall be further treated to allow the recovery of biofuels. It is anticipated the resulting wastewater treatment system will lead to reduction of the cost of construction and operation. This will facilitate its application in small and medium sized-coal gasification power plants found in the region.</p>
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