

Principal Researcher	Toshiaki ENOKI			Number of Researchers	5	
Research Institution · Department · Title	Professor, Department of Chemistry, Tokyo Institute of Technology			Location of Institution	Tokyo	
Title of Project	Local structure of nano-carbon π -electron system and its unconventional electronic and magnetic properties					
Abstract of Research Project	<p>Nanographene or single layer graphite is defined as nanosized π-electron system having open edges. According to theoretical predictions, it has an unconventional electronic structure inherited to the presence of edges, which is essentially different from that of other nano-carbon systems such as fullerene or carbon nanotube, or bulk graphite. The edge-state generated around the Fermi energy is suggested to give novel nano-magnetism including π-electron-based ferromagnetism. Nanographite takes a great advantage in processing with electron beam lithography and chemical modifications, from the point of molecular device applications. We investigate the correlation of electron transport and magnetism on the basis of atomic-level local structure. Target materials are nanographene prepared from nanodiamond, activated carbon fibers consisting of 3-dimensional network of nanographite domains, and nanographene grown on Pt substrate. Followings are issues investigated in the present works; 1. site-dependent local electronic structure of nanographene investigated by probe microscopes, 2. gas-adsorption-induced control of nanoscopic magnetism, 3. applied field control of nonequilibrium electronic state in nanographite network, 4. chemical modification of nanographene edge and the elucidation of the origin of edge states, 5. processing of nanographite wire using electron beam lithography and geometry-dependent electron transport.</p>					
References	<ul style="list-style-type: none"> · Disordered Magnetism at the Metal-Insulator Threshold in Nano-Graphite-Based Carbon Material, Yoshiyuki Shibayama, Hirohiko Sato, Toshiaki Enoki, Morinobu Endo, Phys. Rev. Letters 84(8), 1744-1747 (2000). · Novel Electronic Wave Interference Pattern in Nanographene Sheets, Kikuo Harigaya, Yousuke Kobayashi, Kazuyuki Takai, Jerome Ravier, and Toshiaki Enoki, J. Phys.: Condensed Matters 14, L605-L611 (2002). 					
Term of Project	Fiscal years 2003-2007 . (5years)					
Budget Allocation (in thousand of yen)	FY2003	FY2004	FY2005	FY2006	FY2007	TOTAL
	31,200	21,200	13,500	11,600	11,900	89,900
Homepage Address	http://www.chemistry.titech.ac.jp/~enoki/index.html					