

Principal Researcher	Masahiro Irie			Number of Researchers	4	
Research Institution • Department • Title	Professor, Department of Chemistry and Biochemistry, Graduate School of Engineering, Kyushu University			Location of Institution	Fukuoka	
Title of Project	Single Molecule Optical Memory using Durable Photochromic Diarylethenes					
Abstract of Research Project	<p>The ultimate goal of future ultra-high density optical memory is to store information in single molecules and read the information using photons. Although a lot of effort has been made to change molecular properties by photons at the single molecule level, photoswitching of single molecules has not yet been realized. The aim of the present project is to synthesize suitable photoswitching molecules for the single molecule optical memory and evaluate the performance using a confocal microscope and a total reflection microscope. The photoswitching molecules should be highly resistant to photofatigue and have efficient photoreactivity and high fluorescent quantum yields. We design and synthesize new molecules composed of a fatigue resistant and thermally stable photochromic diarylethene derivative and a highly fluorescent phenylethynylantracene or perylene derivative. The molecules are aligned on polymer film surface and digital fluorescence switching of the molecules will be detected at the single molecule level. The switching of each molecule can be used as a digital information bit for the single molecule memory. Logic circuits using the switching molecules will also be constructed. These results will serve as the base of future single-molecule devices.</p>					
References	<p>1. M. Irie, T. Fukaminato et al. Nature, 420, 759-760 (2002) 2. M. Irie, Chem. Rev., 100, 1685-1716 (2000)</p>					
Term of Project	Fiscal years 2003-2007 . (5years)					
Budget Allocation (in thousand of yen)	FY2003	FY2004	FY2005	FY2006	FY2007	TOTAL
	16,300	18,300	15,200	11,800	11,100	72,700
Homepage Address	Under construction					