S42-1 Development of fluorescence-activated biomoleculer sorter

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Biomolecules such as proteins, nucleic acids and lipids play important roles in living cells. These molecules rarely function by themselves, but usually function by assembling into supermolecule complexes. Although recent advances in fluorescent-labeling technology and fluorescence microscopy have revealed the presence of various supermolecules within a cell, separation techniques of such supermolecules are required to identify their components and to characterize their functions. Although fluorescence-activated cell sorters (FACSs) can sort biological specimens such as fluorescence-labeled mammalian cells with diameters of several micrometers, it is difficult to separate supermolecule complexes. To overcome this problem, we developed fluorescence-activated micro sorter for separating specimens from several nanometers to tens of micrometers. Fluorescent specimens were detected by a highly-sensitive fluorescence microscope system. The specimens were separated in a microsystem. The system was performed by sol-gel transformation of carrier solution containing thermo-reversible gelation polymer (TGP). Gelation of TGP solution was induced by local heating with focused 1480nm infrared laser, which wavelength is near the local maximum absorption of water. We demonstrated the system with fluorescent microspheres, bacterial cells, mammalian cells, and Quantum dots-labeled DNAs.