

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Biomotor-based single molecular biosensor¹ CHIA-FU CHOU, YINGJIE LIU, TAKEYOSHI NISHIO, MRINALINI PRASAD, FREDERIC ZENHAUSERN, Arizona State University — We present our development of novel engineering devices based on biomolecular motors. Adenosine triphosphate synthase (ATPase) is the only rotary motor in nature. The ATPase motor molecules have been genetically engineered to facilitate the immobilization of the motor to Ni surface and to attach additional nanofabricated rods or biomolecules to the γ subunit of the biomotor. These properties enable the possibility of utilizing ATPase in the fabrication of novel engineering devices and systems. This approach may enable the creation of a new class of sensors, mechanical force transducers, and actuators. Here we report our work on constructing an ATPase–nanobar based hybrid system for nanoscale molecular biosensing. We demonstrated avidin-coated Au nanobar can be attached to biotinylated γ unit of the ATPase motor through biotin-avidin interaction and we observed single rotational assay by bright-field imaging.

¹The authors would like to thank Dr. Hiroyuki Noji for his kindly donation of the cell line for expressing recombinant F1-ATPase biomotor from Bacillus PS3

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Date submitted: 08 Dec 2004

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