

Abstract Submitted  
for the DFD09 Meeting of  
The American Physical Society

**Global Visualization in Water using Anodized Aluminum Pressure Sensitive Paint and Dissolved Oxygen as Tracer** TATSUYA OZAKI, HITOSHI ISHIKAWA, Tokyo University of Science, HIROTAKA SAKAUE, JAXA — We have developed anodized-aluminum pressure sensitive paint (AA-PSP) for flow visualization in water using dissolved oxygen as a tracer. Developed AA-PSP is characterized using water calibration setup by controlling a dissolved oxygen concentration. It is shown that the developed AA-PSP gives 4.0 percent change in luminescence per 1 mg/l of oxygen concentration. This AA-PSP is applied to visualize flows in a water tunnel. Oxygen concentrations of the water tunnel and the dissolved oxygen are 9.5 mg/l and 20 mg/l, respectively. We can capture horseshoe vortices over the base of 10 mm cylinder by using this technique at Reynolds number of 1000 and a water speed of 100 mm/s, respectively. Unlike conventional tracers such as ink, milk, and fluorescent dyes, this visualization technique gives flow information on the AA-PSP coated surface without integrating flows between the AA-PSP and an optical detector. Because of using dissolved oxygen as a tracer, it holds the material properties of testing water except for the amount of oxygen. The tracer does not interfere with optical measurements and it does not contaminate the testing water. A conventional visualization technique using milk as a tracer is also employed for comparison.

Hiroataka Sakaue  
JAXA

Date submitted: 06 Aug 2009

Electronic form version 1.4