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Development of Fast Responding Pressure-Sensitive Paint based on Luminescent Polymer YOSHIMI IIJIMA, HIROTAKA SAKAUE, JAXA — The development of fast responding pressure-sensitive paint (PSP) based on a luminescent polymer (PTMST) is discussed. The luminescence of PTMST is sensitive to temperature, which can be used as a global temperature sensor. This polymer is based on poly (1-trimethylsilyl-1-propyne), which is known as one of the highest gas permeable polymer. We combined with a pressure-sensitive luminophore of platinum porpholactone (PtTFPL) to create a fast responding, two-color PSP. The luminescent peak of PtTFPL lies 750 nm, which can be separated from the luminescent spectra of PTMST to give an ideal two-color PSP. Because of its high gas permeability, the present PSP gives the pressure response on the order of milliseconds. The luminescence from PTMST can be used to compensate the temperature dependency of PtTFPL. Steady-state calibrations show that the temperature probe of PTMST provides the temperature sensitivity over the calibrated range (273 K to 333 K) without the pressure sensitivity. The pressure sensitivity of the pressure probe of PtTFPL is 0.6. In the final version, we will include unsteady pressure field measurements with temperature-compensation.

Hirotaka Sakaue
JAXA

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