

2D imaging of pH change around calcium carbonate crystals during dissolution

*Jun Kawano¹, Kaede Nishimura¹, Takashi Toyofuku², Yukiko Nagai², Sachiko Kawada², Henry Teng³, Takaya Nagai¹

1. Hokkaido University, 2. JAMSTEC, 3. The George Washington University

To understand the growth and dissolution mechanism of minerals, the pH monitoring of a solution is a useful technique. Actually a number of the previous studies has performed the pH measurements of bulk solution during the growth. However, to clarify the detail process on the surface, regional change of pH just above the crystal surface should be monitored. In the present study, we have tried to obtain two dimensional images of pH change around CaCO_3 crystals which inorganically grows or dissolves, by using the fluorescent probe 8-hydroxypyrene-1,3,6-trisul-fonic acid (HPTS) which has been applied for the research on the biogenic calcification of foraminifers. As a result, we succeeded to visualize the two dimensional distribution of pH around dissolved CaCO_3 crystal and its change with time, where pH increases above its surface. The results obtained by this technique may provide new insights into not only inorganic growth/dissolution mechanism of CaCO_3 , but also the vital effect on the biomineralization by comparing with the results for bio-related process.

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