

## 초청강연2

### Highly Sensitive Humidity and CO<sub>2</sub> Sensors with Polymer Composites

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We have developed conducting/insulating polymer composites which respond selectively to humidity and CO<sub>2</sub> with high sensitivity. The electrical conductivity of the composite consisting of emeraldine salt polyaniline(S-PAn) and poly(vinyl alcohol)(PVA) is proportional to the humidity in a wide range(10<sup>-5</sup> to 10<sup>-1</sup> Scm<sup>-1</sup>). The change in conductivity of the composite is attributed to the variation of PAn structure between the emeraldine salt and base, that is, the protonic acid is doped and undoped in the moistening and desiccating processes, respectively. Undoped acid is sheltered in the water adsorbed strongly on PVA in a dry atmosphere.

On the other hand, the composite consisting of emeraldine base PAn(EB-PAn) and PVA makes no response to water, because EB-PAn has no dopant to be incorporated. In the presence of CO<sub>2</sub>, however, the carbonate ions are formed by the hydrolysis of CO<sub>2</sub>, and these ions equilibrate with the atmospheric CO<sub>2</sub>. The carbonic acid can be reversibly doped to and ejected from the EB-PAn depending on the concentration of atmospheric CO<sub>2</sub>, and thus the conductivity varies between the conducting and insulating levels. The response of the EB-PAn/PVA composite to CO<sub>2</sub> is so rapid that this composite is very promising as a CO<sub>2</sub> sensor operating at room temperature.