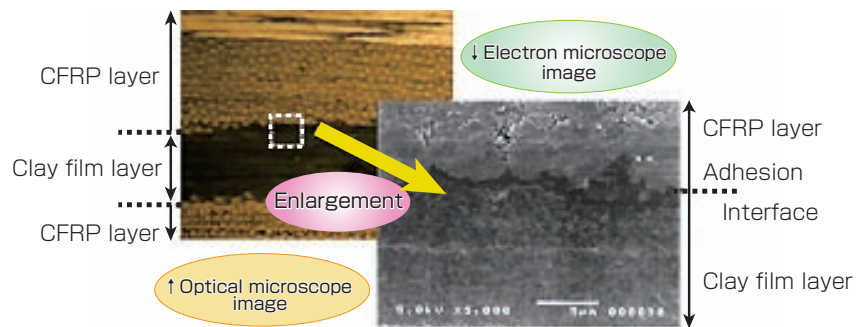


Development of a clay-plastic composite material with high hydrogen gas barrier property

Applicable to hydrogen tanks for aircraft, spacecraft, and cars

We have developed a new composite material for hydrogen tanks. The newly developed composite material has high hydrogen gas barrier performance and high durability. The material was prepared by sandwiching Claiast[®], a clay-based film, between prepreg sheets of CFRP, and then heat pressing them. The material has a simple structure and higher reliability than the conventional materials that use aluminum or high-density plastics as gas barrier liners. The preliminary test results show that the hydrogen gas barrier performance of this material is better than those of other polymer materials by approximately two orders of magnitude. This corresponds to a leakage of 0.01 % of gas per year from a 50-atm hydrogen tank that is 5 m in length and 1 m in diameter. This material is applicable to lightweight hydrogen tanks for use in aircraft, spacecraft and vehicles.



Cross-section photos of the composite material

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Metrology and Measurement Technology

An accurate protein quantification based on amino acid analysis

Development of protein quantification method applied to the certification of C-reactive protein standard solution.

The 'protein standard solution' is especially needed for the measurement of some blood and uric protein concentration in clinical laboratory tests. To determine the concentration of the standard solution, we have established a protein quantification method based on amino acid analysis. The reliability of the quantification method was improved by using isotope-dilution mass spectrometry with isotopically labeled amino acids and by selecting stable amino acids on various hydrolysis conditions. We applied this method to the development of new Certified Reference Material (NMIJ CRM6201-a) that is a solution of C-reactive protein (CRP). This Certified Reference Material characteristically contains recombinant human CRP as a raw material and the certified value is $(39.5 \pm 1.9) \mu\text{mol} / \text{kg}$.

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NMIJ Certified Reference Material,
C-reactive Protein Solution (NMIJ
CRM6201-a)

