Researchers at Kyoto University developed a novel method for strongly bonding a metal and a resin using metallic plating in place of adhesives. Since this method does not require heat treatment of the resin, the properties of the base resin are not affected. Additionally, it enables bonding between thermosetting resins and other materials, which has been difficult with the conventional methods.

- **Background**
  For weight reduction of materials especially in the automotive industry, partial replacement of heavy materials such as steel with lightweight materials is being promoted. To achieve this, various methods to join dissimilar materials such as chemical or thermal bonding have been proposed. However, such methods have problems such as low joining strength (< 30MPa) and limited combination of materials to be joined.

- **Description**
  Researchers at Kyoto University developed a novel method for strongly bonding a metal and a resin using metallic plating in place of adhesives. Since this method does not require heat treatment of the resin, the properties of the base resin are not affected. Additionally, it enables bonding between thermosetting resins and other materials, which has been difficult with the conventional methods.

- **Strong bonding between dissimilar materials**
  Tensile strength of 50MPa or more and tensile shear strength of 70MPa or more were achieved with a combination of CFRP (epoxy resin) and aluminum alloy. In addition, by optimizing the surface treatment condition, a maximum tensile shear strength of 130MPa was obtained.

- **Applicable for any combinations of materials**
  This method can also be applied to a combination of different types of resins - for example, for bonding resins having low adhesive properties.

**Fig. 1** Schematic diagram of the new method
A metal sample (e.g., aluminum alloy) and a resin sample (e.g., CFRP) are surface-treated, disposed opposite each other and joined by filling the gap between them with plating.

**Fig. 2** Comparison with conventional methods
This shows the joining strength between the aluminum alloy and CFRP joined by the new and conventional methods. The new method showed significantly higher joining strength than the conventional methods.