

259<sup>th</sup> Regular Open Seminar (2020 Sep 30)**Title: How to develop sustainable wood-based materials?****Speaker :** Kenji Umemura (Professor, RISH, Kyoto University)**Related RISH mission :** Mission 5 (Quality of the Future Humanosphere)**Abstract :**

Wood-based materials are regarded as sustainable and environmentally friendly materials and are indispensable as materials for building and furniture. The production of wood-based materials is expected to increase in the future according to FAO. Since the wood-based materials basically consist of wood elements and adhesives, the sustainability efforts for these raw materials are important in considering the sustainability of wood-based materials.

Global forest area continues to decrease in recent years, and 178 million hectares disappeared from 1990 to 2020. The disappeared area is equivalent to 4.7 times of the land area of Japan. There is concern about the further decrease by influence of excessive deforestation and climate change. Therefore, positive utilization of non-wood plants is desired. In particular, agricultural wastes are expected as alternative raw materials from the viewpoint of effective utilization of biomass. Actually, potential production of agricultural wastes such as straw, stalk and bagasse is very huge.

Adhesives greatly affect physical and mechanical properties of the wood-based materials. Large quantities of various synthetic resin adhesives derived from fossil resources such as formaldehyde-based resins are being used in wood industry. In recent years, breaking away from dependence on fossil resources has become an important global issue. Considering various global efforts, reduction of the use of synthetic resin adhesives is desirable. In fact, wood and adhesive industries are very interested in bio-based adhesives, and some companies are beginning to use them. Bio-based adhesives have been researched for a long time. However, conventional bio-based adhesives have sometimes complicated preparation, low adhesion performance and high dependence on fossil resources. Therefore, development of novel bio-based adhesives with simple preparation, high adhesion performance and low dependence on fossil resources is required.

Our laboratory has been developed wood-based materials using agricultural wastes and novel bio-based adhesives. The potential of the wood-based materials will be introduced based on the results of physical and mechanical properties.