

Fundamentals of Metal–Organic Frameworks and Their Applications in Industries



• Time: 2026.06.09. (Tue) 16:00-17:15

• Place: 104-E206 Classroom

Speaker

Prof. Kyungmin Choi

Dept. of Chemical And Biological Engineering, Sookmyung Women's University

Abstract

Metal–Organic Frameworks (MOFs) are highly ordered crystalline materials composed of metal ions or metal clusters interconnected by organic molecules acting as linkers to form extended network structures. The development of MOFs has opened a new field of chemistry known as *reticular chemistry*, where compounds are designed and constructed through the assembly of molecular building units according to predetermined structural principles. MOFs possess several remarkable characteristics, including permanent porosity comparable to zeolites, low density, exceptionally high specific surface areas reaching up to 5,351–6,000 m² g⁻¹ (equivalent to the area of a soccer field per gram), tunable functionality through modification of organic linkers, and precise structural designability.

Because of these unique features, MOFs have attracted significant attention for applications in gas storage (e.g., hydrogen, methane, and carbon dioxide), liquid-phase separation, heterogeneous catalysis, drug delivery, sensing technologies, and more recently, solar energy conversion systems.

In this seminar, an overview of MOFs will be presented, including their fundamental concepts, synthesis methods, current status, and broad applications. Particular emphasis will be placed on practical examples of MOFs used for gas adsorption and separation, catalytic reactions, and volatile organic compound (VOC) removal technologies.