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**Green-infinity: Multi-Mix-MOFs born from PET to production solar flues**

The project aims to create innovative Multi-Mix Metal-Organic Frameworks (MOFs) using organic linkers derived from recycled PET plastic waste. The objectives are to synthesize novel MOFs with multiple metal centers within a single structure, demonstrate their high catalytic activity in depolymerizing PET, showcase their superior photocatalytic performance in converting $CO_2$ into valuable fuels and generating hydrogen, and study how different metals affect these materials' properties.

By converting PET waste into valuable linkers like terephthalic acid (TA) and bis(2-hydroxyethyl) terephthalate (BHET), the project addresses plastic pollution and reduces MOF production costs. These recycled linkers become the building blocks for Multi-Mix-MOFs, which can be reused as catalysts for further polymer recycling and as photocatalysts for solar fuel production.

Incorporating various metals into the MOF structures enhances photocatalytic efficiency. Multiple metal centers improve charge carrier separation, reducing electron-hole recombination and boosting activity under visible light. This enables the materials to absorb more sunlight, essential for practical solar energy applications. The diverse metals also enhance selectivity, stability, and create synergistic effects beyond single-metal MOFs.

The project's significance lies in its potential to contribute to renewable energy solutions and greenhouse gas reduction. Photocatalytic $CO_2$ conversion and hydrogen generation are crucial for mitigating climate change. Developing efficient photocatalysts that operate under visible light is key for large-scale solar energy utilization. The research involves synthesizing Multi-Mix-MOFs for both PET depolymerization and photocatalytic applications. It will optimize reaction conditions to improve efficiency and selectivity, using advanced characterization techniques to understand the materials' properties. Photocatalytic performance will be evaluated in hydrogen generation and $CO_2$ conversion processes, aiming for high efficiency under visible light.

In summary, "Green-infinity" is a forward-thinking project addressing environmental challenges through advanced materials science. It offers a promising way to turn plastic waste into valuable resources while advancing clean energy technologies.

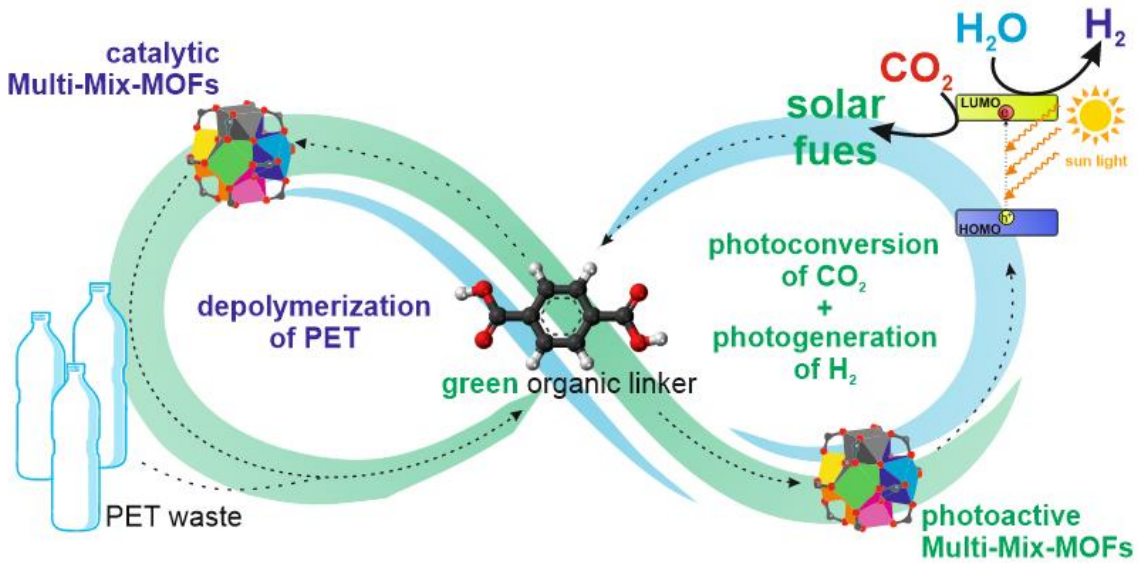


Figure.1. Live cycle of Multi-Mix-MOFs according to Green-infinity principles.