Carbon Dioxide-Based Drug Synthesis from Flue Gas with Silicon-Nanowire-Embedded Micro-Total Capture System (μ-TCS)

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As a result of human activity, many extra carbon dioxide (CO_2) is added without removing, which destroys the balance to add and remove CO_2 by the natural cycle. Moreover, many studies have reported that more CO_2 emissions resulted in higher CO_2 concentration which has correlation with global warming. In this circumstance, there is an increasing need to remove CO_2 efficiently from CO_2 containing exhaust gas, such as flue gas. Herein, we report a silicon-nanowire-embedded micro-total capture system (μ-TCS) based on excellent liquid repellency of superamphiphobic silicon nanowires. In the μ-TCS based on gas-liquid flows, CO_2 is selectively captured from flue gas by an absorbent, is desorbed from the absorbent, and is ultimately utilized to synthesis drug compounds, by all-connected in-situ manner. μ-TCS is expected to provide the best possible efficiency of CO_2 capture and utilization known to date.