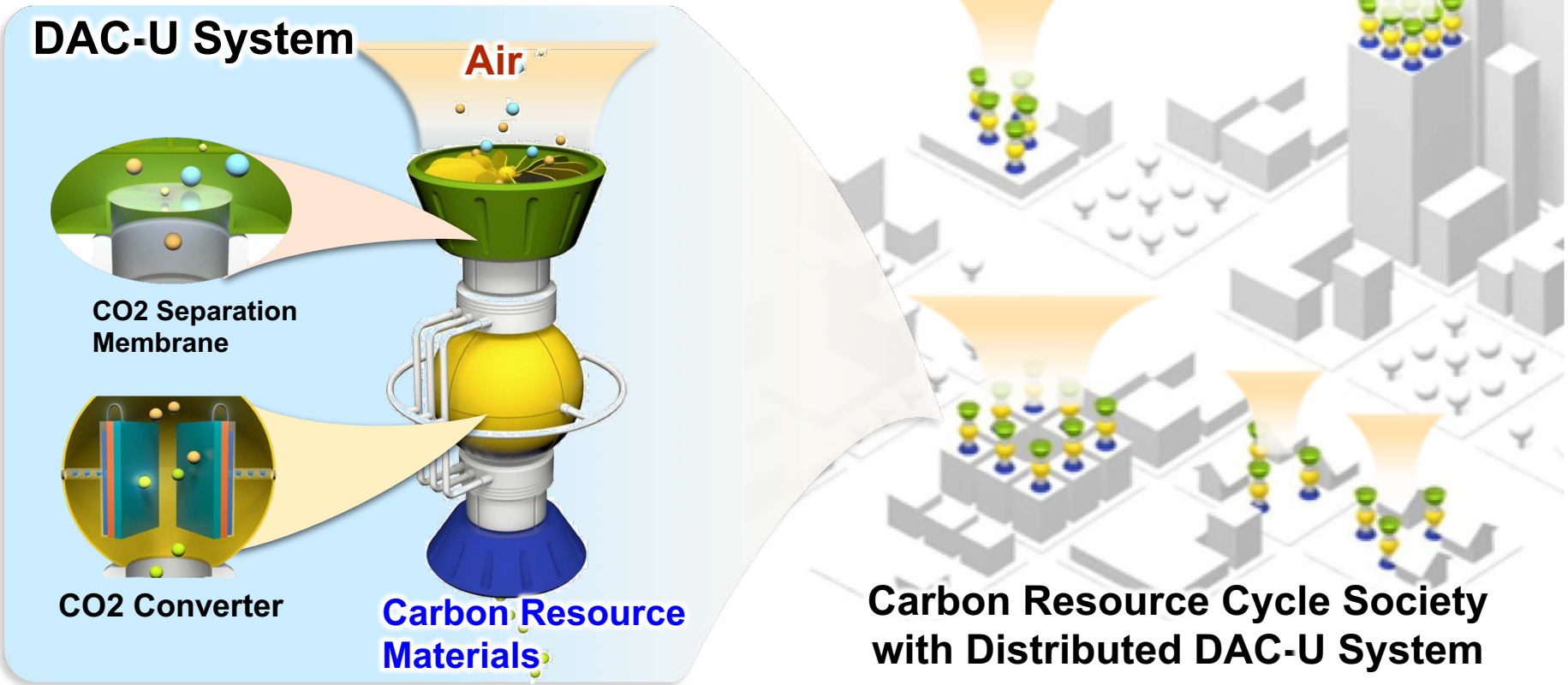
A New Carbon Resource Cycle Society that Obtains Resources from the Atmosphere

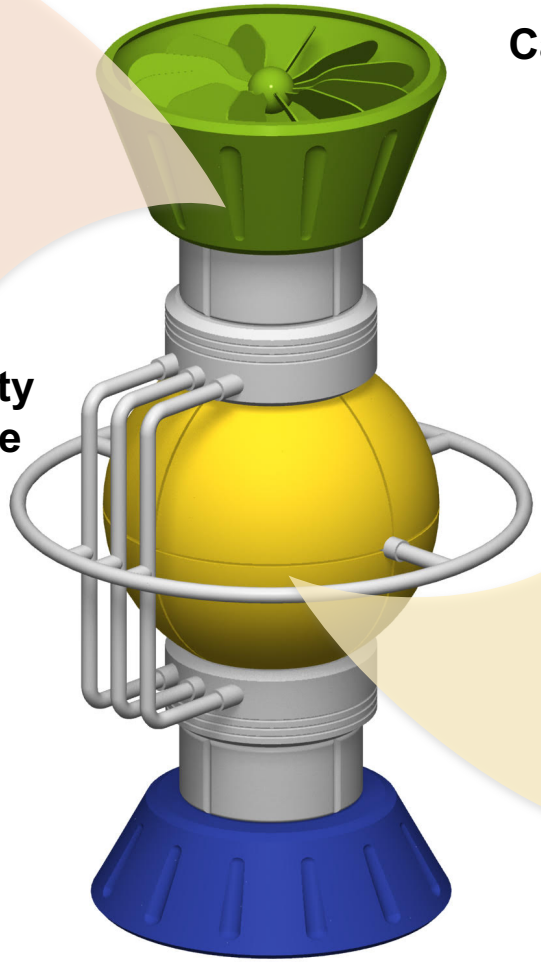
Kyushu University is aiming to realize the Direct Air Capture and Utilization (DAC-U) system. This device concentrates carbon dioxide (CO2) from the atmosphere like an air filter using extremely thin separation membranes and converts it into various useful substances for daily use. This newly developed system is expected to be small and can be installed anywhere. Japan is a country with few natural resources, however, suppose we can create the necessary amount of carbon resources in the required places, using the atmosphere as a source. In that case, this will lead to the establishment of a carbon cycle society (energy society) with local production for local consumption.



Basic Technologies Supporting DAC-U

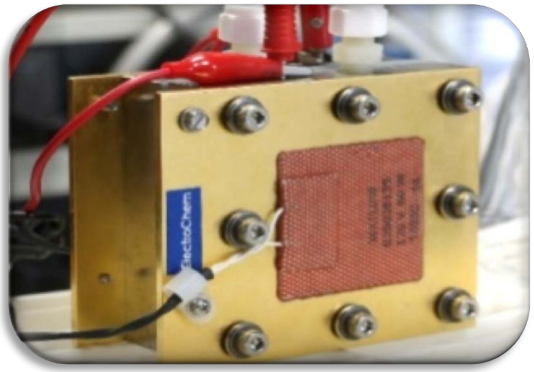
Overwhelmingly high permeability The world's highest performance CO2 separation membrane

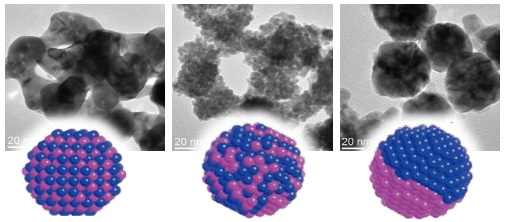
There is only 0.04% CO2 in the atmosphere. Therefore, a large amount of the air must be processed to capture CO2. Kyushu University has developed a separation membrane with an ultimate thickness of only about 1/3000 of the diameter of a hair. This has resulted in the world's highest performance CO2 separation membrane, exceeding the conventional gas permeability by more than 20 times. In the future, we will improve the CO2 selectivity to achieve even higher performance.

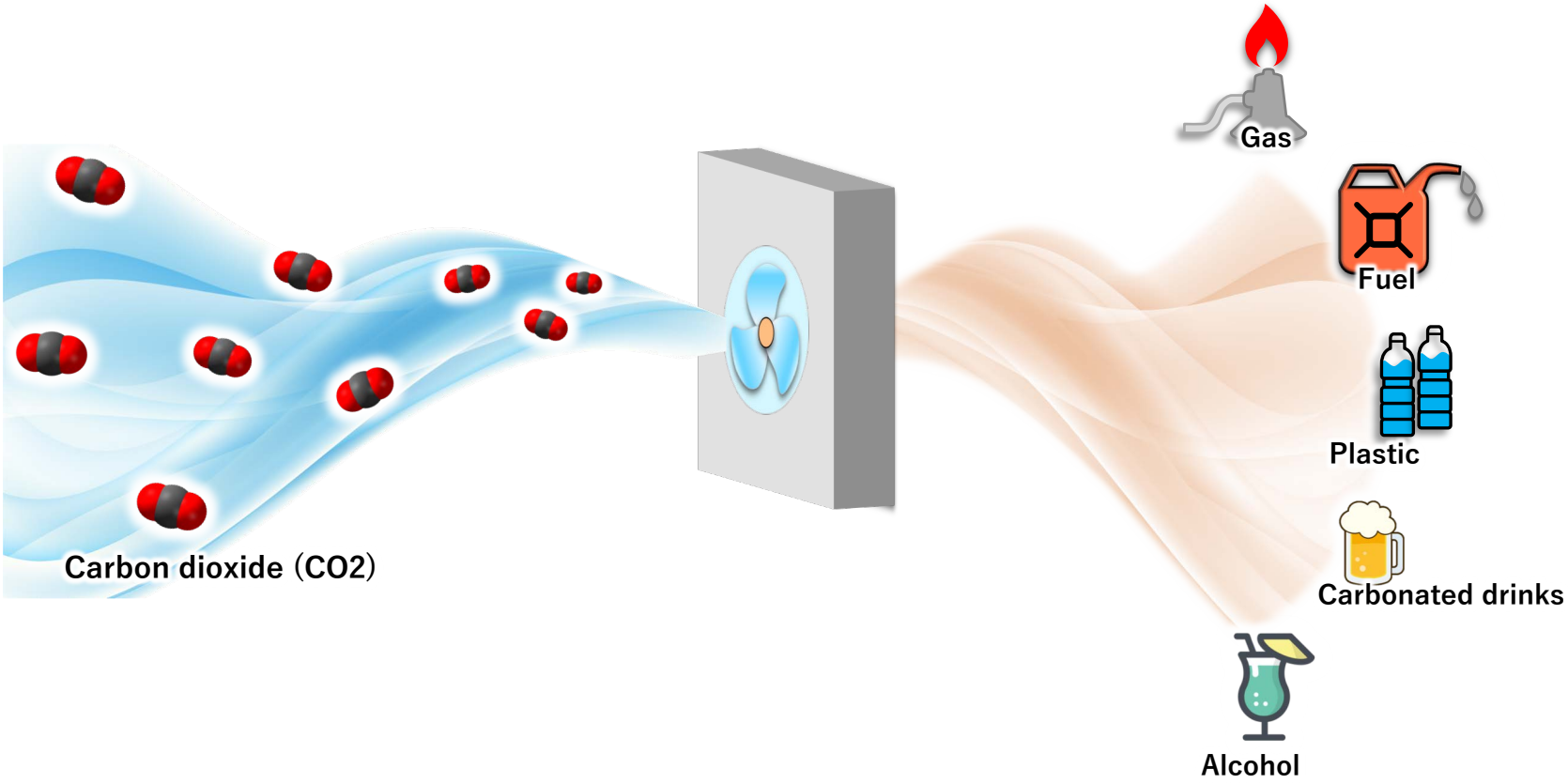


Converting CO2 into various substances Catalyst nanoparticles and reactors

Since CO2 is stable, it requires a lot of energy to be converted into other substances. Kyushu University is developing catalytic nanoparticles that convert CO2 with low energy and their reactors. We have already succeeded in converting CO2 into alcohol and other substances with high efficiency. In the future, we will develop catalysts and reaction systems with higher activity.






Carbon dioxide (CO2)
Gas
Fuel
Plastic
Carbonated drinks
Alcohol