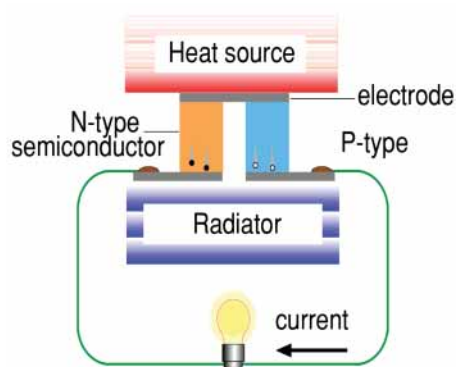


Study the Origin of High Performance of Thermoelectric Property in Skutterudite

We studied on skutterudite to clarify the origin of the high performance of thermoelectric property. Ce L_3 -edge XANES measurements suggested that f electrons hybridize strongly with conduction electrons. Large density of states around Fermi energy can be expected, which may work positive to the thermoelectric property. Electron diffraction measurements elucidated that crystal structure of PrRu₄P₁₂ transfers from body center cubic to simple cubic at $T \sim 60$ K. Nesting of the Fermi surface can be responsible for the transition. Relationship between the anomalous electronic states and the thermoelectric properties should be studied in the future. We also performed crystal growth of skutterudites under a pressure of 3.5 GPa using a wedge-type cubic-anvil high-

pressure apparatus. We found that CoP₃ which melts incongruently at ambient pressure transforms to a congruent melting compound under high pressure.



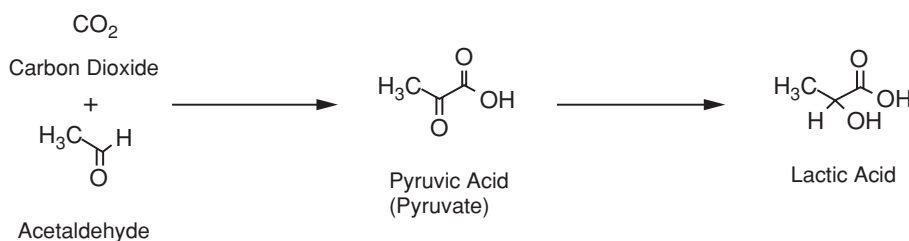
Principle of thermoelectric power generation

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Enzymatic Synthesis of L-Lactic Acid from Carbon Dioxide

We have developed a novel enzymatic process to synthesize L-lactic acid for use in the biodegradable plastics. The process consists from two step enzymatic reaction: reverse reaction of pyruvate decarboxylase and asymmetric hydrogenation of pyruvic acid by L-lactic dehydrogenase. First, we have turned the decarboxylation

of pyruvate on its head. The reaction proceeded at higher pH in bicarbonate buffer. Then we tried two step reactions to produce L-lactic acid. We could obtain L-lactic acid in satisfactory yield with higher optical purity. This method can be useful for utilization carbon dioxide as a chemical source.



Synthetic Process of L-Lactic Acid from Carbon Dioxide

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