

# FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

**Project Title:** Development of Mechanical Energy-Induced Reaction

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## 1. Background of research

Since the Industrial Revolution, humankind has produced tremendous amounts of energy by combustion of fossil fuels, establishing modern civilization. However, as the result of this gigantic energy production and consumption, we are now confronting the depletion of the fossil fuels and the global warming, which is caused by greenhouse effect of carbon dioxide generated by fuel combustion.

## 2. Research objectives

Our main purpose is to develop new reactions that can directly convert mechanical energy into chemical energy. This reaction can provide a new energy fixation procedure, in contrast to existing fuel combustion systems. The first goal is the establishment of the new reactions that enable mechanochemical energy fixation. This is also the key to success of the project.

## 3. Research characteristics (incl. originality and creativity)

Wind and hydro electricity, which is renewable energy production, can convert mechanical energy into electricity. However, these electrical generation plants require huge equipments and electronic generators. On the other hand, more simple and convenient devices can be used in this reaction. Although mechanochemical reactions have been studied extensively, the new point of this project is energy fixation. This was not considered in the previous studies.

## 4. Anticipated effects and future applications of research

Small mechanical energies that can not be collected through conventional electronic generation systems may be used in the mechanochemical reaction for production of high energy chemicals. Such produced high energy chemicals may be utilized as energy sources for fuel cells in future.