

# Development of innovative batteries for electric vehicle application

-Overview of RISING Project-

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## Background and Project objectives

### <Background>

- Increasing demand for environmentally-benign electric vehicles (EVs)
- Current EVs with limited driving distance (ca. 100 km / charging) due to insufficient energy of batteries, even with best lithium ion batteries (LIBs)
- Innovative batteries with high energy density (5 times of LIBs') required

### <Establishment of RISING project>

**RISING (Research and Development Initiative for Scientific Innovation of New Generation Batteries) Project** founded in Kyoto University in 2009 under support of New Energy and Industrial Technology Development Organization (NEDO) Japan

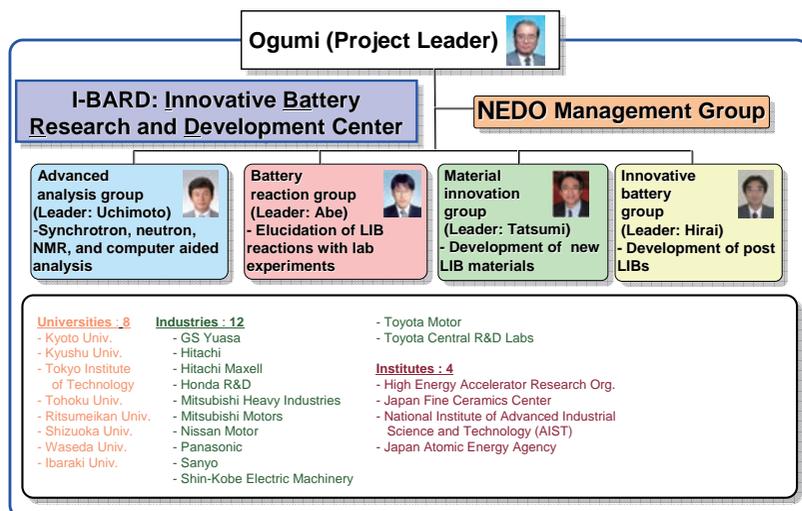
### <Project target>

1. Development of technology to realize innovative batteries with its performance much superior to LIBs
2. Establishment of novel analytical methods with society-academia collaboration to understand and improve LIBs
3. Formation of interdisciplinary community for battery development



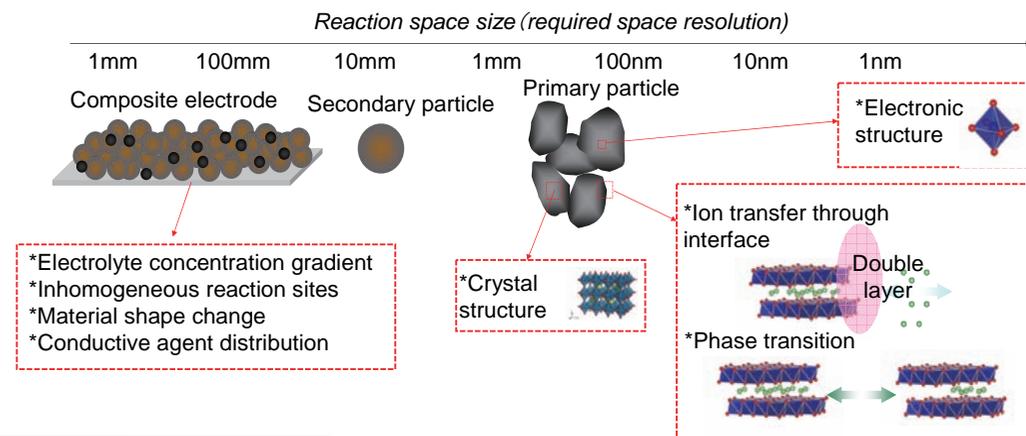
RISING kick-off meeting (Oct. 2009)

## Formation of RISING Project



## Technical Focus

- ✓ Observing through different space and time ranges
- ✓ Understanding LIB limitations to give new concepts for innovative batteries



## Prospects

	2009	2010	2011	2012	2013	2014	2015
Development of advanced analysis	Development of hardware facilities and method		Facilities optimization and multi-functional analysis establishment				
Elucidation of LIB reactions	Reaction mechanism elucidation		Degradation mechanism		elucidation		
LIB material innovation	Guidelines		to LIB material		innovation		
Basic research for post LIBs	Development of Innovative Batteries(Post-LIB) and its evaluation						

### <Summary>

- ✓ Fundamental R&D activities needed for realizing batteries for vehicles
- ✓ Understanding limitation of current LIB technology with advanced analysis
- ✓ Fact-based new concept for realizing innovative batteries performing much superior to LIBs