Material evaluation of battery pack

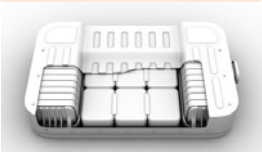
Analysis for the materials of battery pack & casing such as plastics & resins are available
- Material evaluation by the perspective of thermal management and safety
- Support for optimal design by evaluation of thermal stability

Required performance of battery

Evaluation items		
Light weighting	Intensity・Toughness・Crashworthiness	Compression・Collision・Vibration
Thermal diffusion・Thermal Stability	Flame proofing・Thermal Insulation	Waterproof・Salt spray・Immersion
Electrolyte endurance	Insulation	Electromagnetic wave shielding

Module

Battery pack



Material analysis・Safety testing for peripheral parts of battery

Evaluation analysis & testing			
Material Analysis	Intensity・Toughness・Impact	Tensile test, Crush test, Young's modulus, Digital Image Correlation Filler distribution, CF orientation by X-ray CT Observation of resin delamination by ultrasonic microscope	
	Thermal design	Thermal conductivity（Specific heat, density）、Emissivity, Reflectivity, Thermal resistivity, Characterization of Heat discharge material (filler amount, dispersibility), Thermal fluid simulation	
	Flame proofing・Thermal insulation	Combustion test, Smoke emitting test Compositional, Physical, impurity analysis of material after testing	
	Thermal stability	Linear coefficient of expansion, Compositional, Physical properties	
	Waterproofness	Absorptivity（Immersion test）, Isotopic marker method（SIMS）, TPD-MS analysis	
	Electrolyte endurance	Permeability analysis of electrolyte and solvent crack analysis Compositional analysis after electrolyte immersion test	
	Insulation	Relationship with Optimum specific resistance and temperature, Moisture ratio, Voltage breakdown test	
	Long term Reliability	Durability test, Evaluation test after degradation test	
Safety testing	Mechanical	Nail penetration , Crush test	Gas analysis during the testing
	Electrical	Over charging, discharging test	
	Environmental	Heating, Combustion, Fire resistance	

Thermal stability evaluation for battery materials

Heat and gas generation at short circuit can be estimated from calorific value & gas generation from LIB materials

Applied to optimal design of peripheral parts of battery, battery case and pack