



## Prof. Masahiro SUSA

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Research field: Thermophysical properties of  
high temperature melts

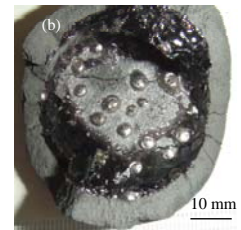
### Research topics conducted within the G-COE project

Many materials including metals and alloys are produced via melts at high temperature. Thus, the production of materials having good quality strongly requires stricter process design and control based upon mathematical modelling using accurate data for thermophysical properties of the melts. Against such industrial requirements, we have poured our efforts into measurements of density, thermal conductivity, emissivity, refractive index and so on for molten metals and glasses.

We are also developing ultra-low thermal conductivity materials based upon physical property measurements at high temperature. In addition, we are investigating 'Ironmaking in Space' for the future of humanity.

#### 1. Thermophysical properties at high temperature

- Radiation heat transfer control in mould fluxes for slow-cooling continuous casting
- Measurements of thermal conductivities and emissivities for liquid iron alloys
- Physical property measurements of Ge-Sb-Te system for phase change memory devices



#### 2. Materials and processing

- Ultra-low thermal conductivity materials for automobile engine
- Extraction of iron from simulated lunar soils

Extraction of iron from simulated lunar soils:  
(a) slag obtained and (b) iron particles  
produced at bottom of crucible after  
reduction experiment

#### Representative publications

- M. Kuwahara, R. Endo, T. Fukaya, T. Shima, Y. Iwanabe, P. Fons, J. Tominaga, M. Susa: "A Reversible Change of Reflected Light Intensity between Molten and Solidified Ge-Sb-Te Alloy", *Japanese Journal of Applied Physics*, **46** (2007) L868-L870
- S.H. Firoz, R. Endo, M. Susa: "Chemical state of fluorine in fluoroaluminosilicate slags in glassy and molten states from perspective of electronic polarisability", *Ironmaking and Steelmaking*, **34** (2007) 437-443
- M. Susa, M. Watanabe, S. Ozawa, R. Endo: "Thermal conductivity of CaO-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub> glassy slags: Its dependence on molar ratios of Al<sub>2</sub>O<sub>3</sub>/CaO and SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>", *Ironmaking and Steelmaking*, **34**(2007) 124-130