

Division of Natural System	Research field	Mineralogy and Crystallography	Lab. ID
			NS19
Laboratory web site	http://earth.s.kanazawa-u.ac.jp/~hamada/mingroup/top.htm		
Research subjects			
<p>The Earth is composed of "a rock" (83 vol.%) with molten metal (17%, outer core) and solid metal (0.7%, inner core) at the centre. Rock is an assemblage of minerals and therefore the major part of the Earth is an assemblage of minerals. Scope of our laboratory is an investigation of nature of those minerals (naturally occurring, mostly inorganic, crystals), relating melts and amorphous (glass) phases.</p> <p>A nature of such an condensed matter should depend on their stereochemistry. Atoms can be condensed in solid in an ordered state, and sometimes disorder state due to quenching. Partial disorder or modulation may occur due to external pressure and/or their own nature. In such circumstances simple consideration of minerals and glasses as an "3-dimensional array of balls" will be insufficient and further consideration such as electron configuration of bunch of atoms (complex, cluster, molecular orbital, etc.) will be needed.</p> <p>With such simple background, we are tackling problems on diverse fields for complexity of the natural system.</p> <ol style="list-style-type: none"> 1. Study on relationship among atomic configuration and physical properties of metal-oxides, particularly Fe and Ti. 2. Basics of precipitation of solid from liquid, and its application on fabrication of functional metal-oxide thin film. 3. Structure of silicate-melt and silicate-glass and processes on their compression and destruction. 4. Study on behaviour of amino-acid-amorphous silica-complex under shock compression as an analogue of meteorite fall. 5. Ion-partitioning and modulation on atomic arrangement on feldspathoid mineral. 6. Spin-state in wüstite under ultra-high pressure. <p>We have several types of electrical furnaces, three four-circle diffractometers, two two-circled diffractometers, two X-ray fluorescent spectrometers and various types of X-ray cameras installed in our laboratory for preparation and evaluation of samples. We have been conducting corroborative projects with Universities and private companies.</p>			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
<p>In addition with small meeting of each unit our laboratory have weekly seminar for whole lab members. This weekly seminar is usually utilized for reporting recent progress by students, introducing classic articles and reporting most recent advancements on his/her own topic.</p> <p>Every single student should have his/her own research topic, plan experiments, compile results and finish his/her own research work by him/herself under guidance from supervisor.</p> <p>We strongly recommended students to have a presentation of their achievements at an international conference.</p>			
Daily life in the laboratory, etc.			
<p>Students' room and experimental labs (devices) are separated. One dedicated desk with bookshelf is provided for every single student. We have open PC in students' room, which can be connected to academic IP network which is not open for students.</p>			
Message or comments by the laboratory faculty staffs			
<p>Please keep it in your mind that students in a postgraduate school are nothing but "young scientists". Only difference between postgraduate students and their supervisors should be an amount of experience, and both are evenly under the necessity of being logical and faithful on research.</p>			
Recent Master theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2017.3	Synthesis and structural evaluation of $\text{Fe}_{3-x}\text{Ga}_x\text{O}_4$ series ($0 \leq x \leq 0.6$): Relationships among cation distribution scheme and changes in crystal structures.		
2017.3	Nano-structure and physical property changes of $\text{Ca}_2\text{Si}_2\text{O}_6$ and $\text{CaMgSi}_2\text{O}_6$ glasses by cooling rate change and mechanical grinding		
2017.3	The high pressure behavior of alanine-silica gel complexes by shock compression		
2014.3	Shock compression of synthetic amino acid - silica gel complexes modeling for comet nucleus		
2013.3	Effect of Ti- and Cr-doping on the structure of magnetite		
2013.3	A study for heat-treatment and compression of diatom		
2013.3	Structural change of plagioclase glasses by mechanical milling		
2013.3	Structural changes for silica gels milled by two different techniques and structural changes for acid treated diatom by milling and compression		
Recent Doctoral theses in these 3 years (+ more if appropriate)			

year.month	Thesis title (including English translation of Japanese thesis title)
2017.3	Interaction of Radioactive Substances, Salts and Microorganisms in Paddy Soils in Dodoma, Tanzania
2016.3	Characteristics of Microbial Mats in Fukushima prefecture, after the 2011 off the Pacific coast of Tohoku Earthquake on March 11, 2011.
2014.3	The structural changes and water behaviors in hydrous amorphous silica materials under high pressure and temperature
2013.3	Structural changes of alkali feldspar by ball milling and shock compression
2013.3	The relation between plant withering and its soil condition –The influence of the soil permeability on soil acidity and the black pine trees growth–
Laboratory mail address	Masayuki Okuno <mokuno *at* staff.kanazawa-u.ac.jp>