

New Employee - Planned Activities

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New Employee: _____ Start Date: _____

This employee is expected to be an Authorized User for the INITIALED activities within the next 12 months. Please establish training requirements and medical surveillance accordingly, unless a specific exemption is described in the comments at the bottom of the page. If the employee will also be authorized for activities in another work group, note the activities in comments. Contact ESHA for any questions.

Supervisor Signature: _____ Ames Lab ID: _____ Date: _____

 ADMIN ONLY: This employee will ONLY be assigned administrative duties conducted in a typical office environment.

New Employee - Planned Activities

Group Leader: *Matt Kramer*Supervisor: *Yong Liu*

30400.047 Single Crystal Growth by Bridgman Technique

Group Leader: Matt Kramer

Last Review: 3/16/2015

Supervisor: Yong Liu

Next: 3/16/2018

Status: Approved

Activity Description: To grow single crystals by Bridgman technique. Bridgman technique uses a vertical single-zone split tube furnace with maximum temperature 1500 C. The heating zone is relative short in order to generate a large temperature gradient. The alumina tube will be fixed while the furnace can move up and down by electromechanical positioning system. The tasks required include: 1. weighing chemicals (toxic, air-sensitive or hazardous chemicals in a glove box). 2. Sealing the chemicals in a quartz tube with torch or in a tantalum tube by arc melting. 3. Placing the sealed tube in the furnace, programming and running the furnace for a specified profile. 4. Removing sample from tube.

30400.048 Crystal Growth from High-Temperature Solutions

Group Leader: Matt Kramer

Last Review: 3/16/2015

Supervisor: Yong Liu

Next: 3/16/2018

Status: Approved

Activity Description: To grow single crystals from high-temperature solutions and synthesize polycrystalline samples. Solution growth is done using a vertical two-zone split tube furnace with maximum temperature 1200 C. The heating element is a high resistance wire such as Nichrome 80/20 (80% nickel, 20% chromium). A box furnace with maximum temperature 1500 C may be used. Heating element: SiC. Purge gas: N₂, Ar, or O₂. The furnace also can be used for sintering polycrystalline samples under Ar and O₂ atmosphere. The tasks required include 1. Weigh the chemicals in glovebox and seal the chemicals in quartz tube with torch or tantalum tube by arc melting. 2. Place the tube in box furnace

30400.049 Bioinspired FWP

Group Leader: Matt Kramer

Last Review: 6/8/2016

Supervisor: Andrew Hillier

Next: 6/8/2021

Status: Approved

Activity Description: Deposit gold and silver onto DNA templates and characterize their structure, morphology, and optical properties using a series of different microscopes, including atomic force and scanning electron microscopy.

Comments:

<input type="checkbox"/>	30407.019	Crystal Growth with Image Furnace
Group Leader:	Matt Kramer	Last Review: 3/23/2012
Supervisor:	Yong Liu	Next: 3/23/2017
Status:	Under Review	
Activity Description:	The floating zone (FZ) technique with optical heating is a crystal growth method for various classes of oxides and intermetallics. It is a container-free technique. Oxide and intermetallic powders are sintered/cast into rods and loaded into the FZ furnace. Four ellipsoid mirrors are used for focusing of the light emitted from halogen lamps. The lamps are positioned in the 1st focal points of the respective mirrors whereas all the 2nd focal points coincide with the molten zone position. The crystal is moved and the crystallization process of the molten zone proceeds along the perpendicular (vertical) axis. Elements that display high vapor pressure and/or high toxicity in the vapor form will not be used in this activity.	
<input type="checkbox"/>	30409.005	X-Ray Measurement Facilities
Group Leader:	Matt Kramer	Last Review: 12/11/2014
Supervisor:	Matt Besser	Next: 12/11/2019
Status:	Approved	
Activity Description:	Multiple X-ray diffractometers and X-ray fluorescence systems are used to measure structure, chemistry, and properties.	
<input type="checkbox"/>	30416.002	Sample Preparation
Group Leader:	Matt Kramer	Last Review: 12/11/2014
Supervisor:	Kurt Koch	Next: 12/11/2019
Status:	Approved	
Activity Description:	Specimens are prepared for examinations by TEM or SEM in this area. General operations involve small amounts of cutting, potting and polishing of small specimens. Consumable supplies include fine abrasives, Acids, Bases and Solvents. Required training is documented in appropriate log books which includes mandatory knowledge of the use and location of MSDS and safety showers. Attached document is that of a training log.	
<input type="checkbox"/>	30416.005	Electron Microscopy
Group Leader:	Matt Kramer	Last Review: 8/31/2012
Supervisor:	Matthew Kramer	Next: 8/31/2017
Status:	Developmental	
Activity Description:	Microscopic examinations of various research materials on either SEM or TEM specimens are performed here. This facility has a relatively low potential for personnel injury, however, the equipment is not so fortunate. Intensive training is given and documented for potential instrument operators. To maintain the desired high performance standards, access on two of the machines is limited to those with a considerable knowledge and longterm commitment. Individualized training is conducted on a one-on-one basis during which various safety aspects are also introduced.	

Comments:

<input type="checkbox"/>	30416.006	High Temperature Oxidation Test
Group Leader:	Matt Kramer	Last Review: 10/14/2011
Supervisor:	Pratik Ray	Next: 10/14/2016
Status:	Approved	
Activity Description:	A sensitive microbalance is used with a furnace to monitor the mass of a sample at a controlled temperature. Some of these furnaces are rated to very high temperatures, ranging from room temperature to at least 2000 degrees Centigrade.	
<input type="checkbox"/>	30416.007	Powder Processing
Group Leader:	Matt Kramer	Last Review: 11/12/2013
Supervisor:	Pratik Ray	Next: 11/12/2018
Status:	Approved	
Activity Description:	This is a broad-ranging activity that describes the principal technique used by the group to fabricate new research samples. The process involves synthesizing the compound, grinding and sieving the material to a fine powder size, pressing the fine powder into a pellet shape, and high temperature treatment to consolidate the powder into a dense article. More specifically, materials are synthesized by weighing appropriate quantities of elements and arc-melting to form the compound. Arc-melting is performed by MPC. The compound is then ground into a small particle size using a mortar/pestle or vendor purchased grinding equipment. The powder is sieved using fine mesh screens to obtain a small particle size, and the powder is then pressed into a pellet in a cylindrical steel die in a hydraulic press. The pellets are then fired in various high temperature furnaces.	
<input type="checkbox"/>	30416.008	Metallography
Group Leader:	Matt Kramer	Last Review: 11/12/2013
Supervisor:	Pratik Ray	Next: 11/12/2018
Status:	Approved	
Activity Description:	This is another broad-ranging group activity pertaining to the microstructural analysis of reasearch samples. The process usually involves cutting the sample in low or high speed diamond saw. The sample is then mounted in either an epoxy-based or thermoplastic polymer. The mount is then ground and polished using abrasive paper and abrasive slurries to produce a mirrOr-like finish. Chemical etching may be used to enhance the microstructural contrast of the sample.	
<input type="checkbox"/>	30416.009	High Temperature Mechanical Test System
Group Leader:	Matt Kramer	Last Review: 11/12/2013
Supervisor:	Pratik Ray	Next: 11/12/2018
Status:	Approved	
Activity Description:	Measurement of breaking load for specimens in a controlled atmosphere at elevated temperature.	

Number of Activities: 11

Comments:
