

# Job Safety Analysis

(JSA)

College/Department/Unit: Mechanical Engineering

Title of Job Activity: Mechanical Alloying and Ball Milling Using The Planetary Ball Mill

Location of Activity: OC19 Engineering Building

Title of worker who does activity: Graduate Student

Supervisor of Activity: Prof. Jerzy Szpunar

Competency Requirements: Laboratory Safety Course, Machine Specific Training (offered by Mr. Seyed Salman Razavi Tousi), knowledge of chemical reactions taking place before, during or after milling.

Monitoring and Measurement:

Date of Original JSA: July 6, 2011

JSA #: Mat00034

JSA Approved by:

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Prof. Jerzy Szpunar

Date:

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Review Frequency: Yearly

Review History

Review Date	Reviewed By	Signature

Individual worker sign off for reading and understanding the Job Safety Analysis:

Date	Name	NSID	Signature
	Seyed Salman Razavi Tousi		

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Basic Job Steps	Possible Hazards	Preventative Measures
PPE Required		Gloves, glove box or fumehood
Prior to Milling	Explosive reaction	<p>Knowledge of what is going to happen in the mill is necessary.</p> <p>If there is a possible reaction between air and the materials, the cups should be loaded in a glove box containing an Argon atmosphere.</p> <p>Alumina cups cannot be sealed and therefore this should be considered if a reaction with oxygen (air) is possible.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>1. Al and PbO does not react at room temperature generally, but after milling an explosive reaction will occur at room temperature.</li> <li>2. Titanium powder does not regularly react with air, but after milling a highly exothermic reaction will occur.</li> </ol>
Use of Liquid Nitrogen to cool cups	Burns and asphyxiation	All safety procedures for handling liquid nitrogen should be followed, see the applicable SOP.
Removing the milling cups	Rotating machinery entanglement	After turning off rotation wait until the rotating equipment has come to a full stop before opening the protective covering.
Removing the milling cups	Burn hazard	The vials are hot after milling, wait a minimum of 1 hour before removing them, prior to contacting them with your hand check the temperature with a non-contact temperature measurement device.

Opening the milling cups	High pressure release	If there is a possibility of a pressure build up in the cups from milling the pressure must be release slowly (away from your body) before loosening the pullers on the cups.
Opening the milling cups	Reaction with Oxygen	If a reaction with oxygen (air) is possible the cups should be opened in a glove box or a fume hood (the choice will depend on the reaction and the results of that reaction)

Notes:

- This Job Safety Analysis (JSA) is a supplement to the vendor supplied instruction manual, which must be followed.
- If a compressed gas cylinder is used the applicable SOP for compressed gas must be followed.
- This instrument is not suitable for materials that may produce toxic gases. Toxic and radioactive materials cannot be milled with this machine.

Reference Only