

HOW TO COOK WELL? THE ART OF USING BALL MILLS IN MECHANOCHEMISTRY.

Marek Polański*, Paweł Płatek^a, Dariusz Siemiaszko^a

Military University of Technology, Warsaw , Poland

e-mail: marek.polanski@wat.edu.pl

The presentation will be made in the form of a teaching activity dedicated mostly to young researchers to familiarize them with possible issues arising while using ball mills in mechanochemistry experiments. The proper sealings will be described in order to avoid oxidation and hydrolysis. The basics of the proper choice of the vial material will be described together with the proper choice of material and size of the grinding media. The influence of so-called ball-to-powder ratio (BPR) and vial filling factor on the result of grinding will be shown and explained. Unusual cases of the use of ball mills such as combinatorial milling will be presented. A “ how to make your own vial” tutorial will be shown to allow young researchers to design their own high-pressure milling cylinder with wireless transmission of pressure and temperature. The concerns regarding the replicability of ball milling experiments will be discussed.



LTC Marek Polański, PhD, DSc – a researcher with 15+ years of experience in mechanochemistry and synthesis of solid-state hydrogen storage materials (SSHSM). His research focuses on magnesium-based materials for hydrogen storage as well as the design of new synthesis and characterization techniques of SSHSM.



LTC Paweł Płatek, PhD - a researcher with 15+ years of experience in implementation of CAD/CAE engineering systems in practical applications, usage of advanced numerical modeling techniques based on the FEM, DEM, SPH methods. Expert in additive manufacturing and mechanical characterization of mechanical properties of materials under dynamic loading conditions.



Dariusz Siemiaszko, PhD – a researcher with 15+ years of experience with powder metallurgy, especially pressure-assisted induction sintering (PAIS) of intermetallic alloys. Engineer and designer. Expert in data curation and uncertainties estimation.