Lapping Tool Surface Control
（仕上研磨工具表面の制御）

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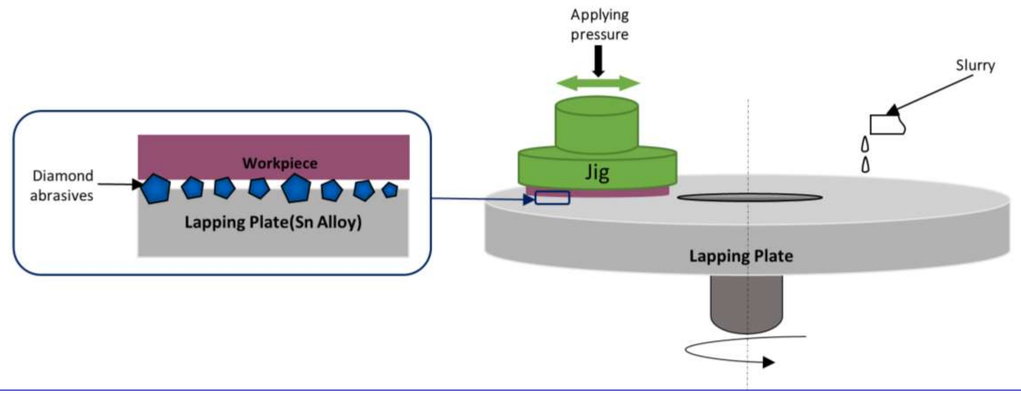
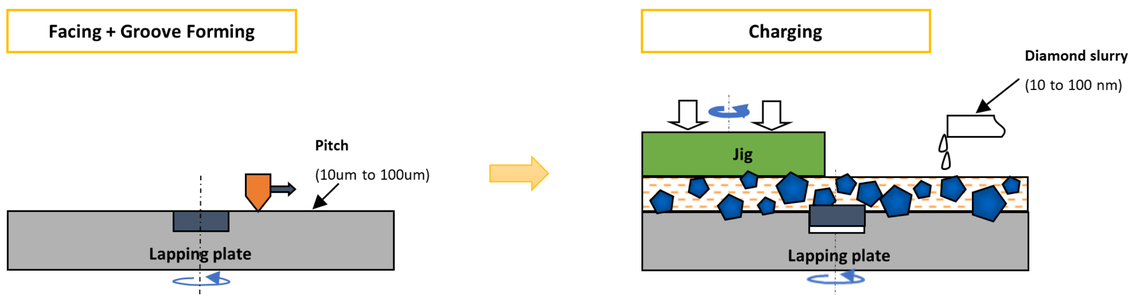
Research Background

Lapping is a crucial machining method used in many industries, including metal, electrical components manufacture.



◆ Preparation of lapping plate
1. Facing,
2. groove forming
3. Charging with diamond abrasives(10 to 100 nm).



◆ Sn alloys with a small fraction additives such as 1% of Bi or Sb, are currently used as lapping plate material in the ***HDD*** fields.

Current Issue

Sn alloy plate surface become rougher and rougher during exposure time after charging and before lapping the products
→ process instability, poor product lapping quality and lower lapping efficiency
→ negative product qualities and increased costs

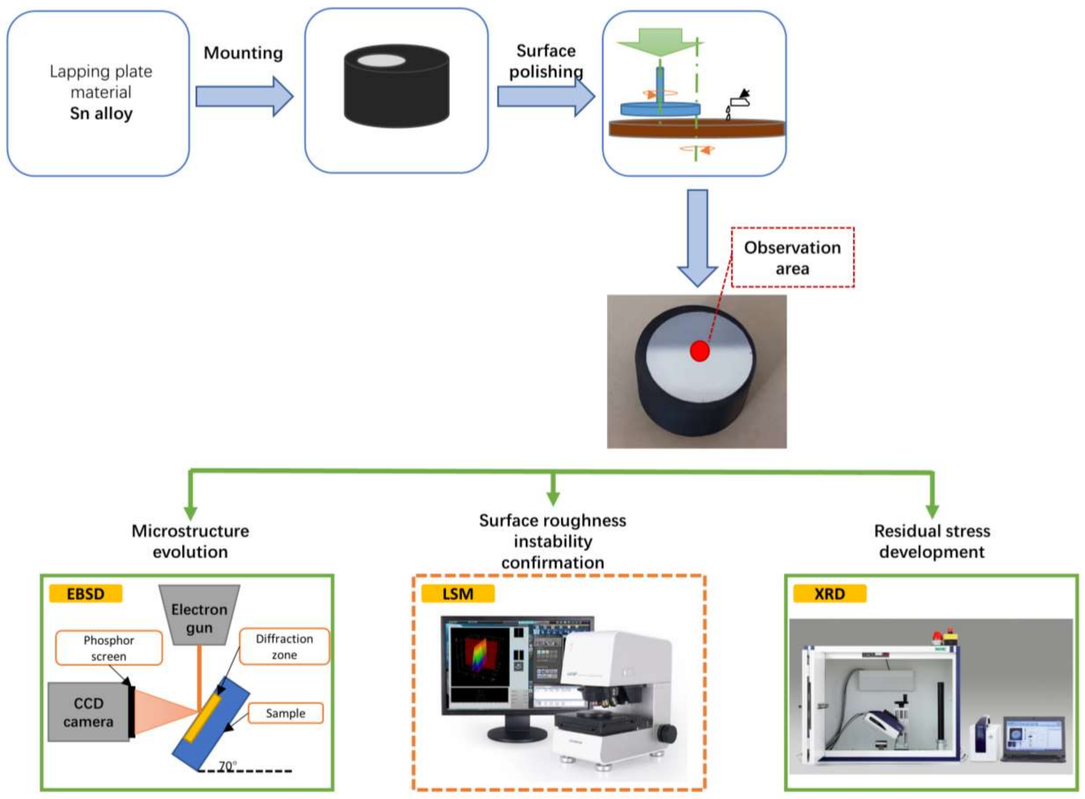
Research Objective

◆ elucidate the detailed mechanism of the Sn alloy surface deterioration over time
◆ investigate the effects of cast/forge conditions on surface roughness instability
◆ add different additives such as Sb or Pb to pure Sn with the various amount(1%, 5%).

Method

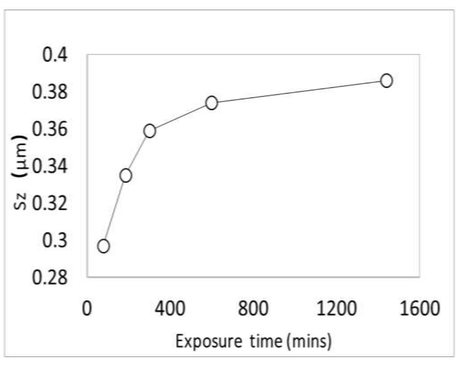
Such Sn alloy plate surface instability is considered due to the metallic structure changing of material itself.

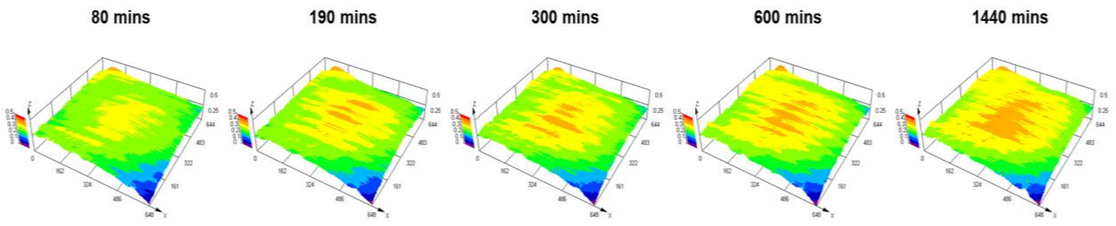
- Microstructure observation
- Residual stress measurement
- Surface roughness confirmation

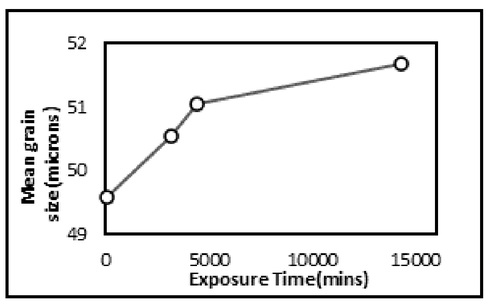


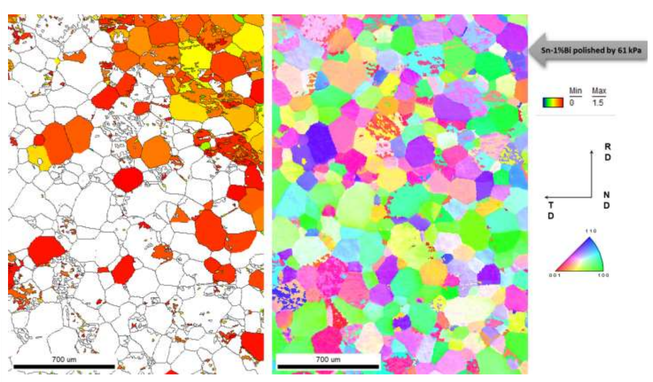
Results and Summary

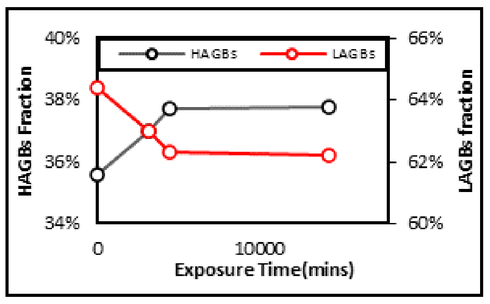
Surface instability over exposure time on same area of Sn-1%Bi polished under 122kPa

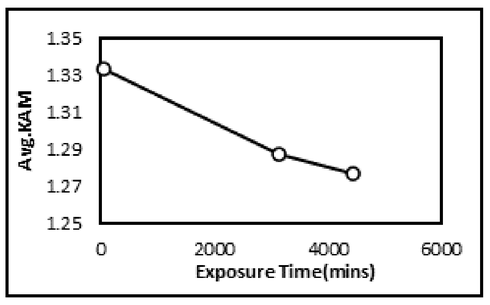












Recovery and recrystallization after polishing under pressure, (grain growth, an increase in the misorientation angle between grains) and the release of surface residual stress → surface roughness instability of Sn-1.0wt%Bi alloy

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