Received 10 December 2016; received in revised form 15 January 2017; accepted 21 February 2017.
To cite this article: Shuhaib and Wani (2017). Self-lubricating tribological characterization of lead free Fe-Cu based plain bearing material. Jurnal Tribologi 12, pp.18-37.

Self-lubricating tribological characterization of lead free Fe-Cu based plain bearing material

Shuhaib Mushtaq*, M.F. Wani

Centre for Tribology, Department of Mechanical Engineering, National Institute of Technology Srinagar, 190006 India.
*Corresponding author: shuhaibmushtaq@gmail.com

HIGHLIGHTS

- *Effect of Tin concentration on density.*
- *Vickers hardness of 3.71GPa for higher wt. % of Tin and BN.*
- *Lower coefficient of friction and higher wear resistance.*

ABSTRACT

The negative impact of lead on environment and thereby its reciprocity on the health of mankind, there is a growing emphasis on resisting the usage of lead in bearings. Owing to this, new bearing materials that provide comparable tribological performance to that of lead containing alloys are being developed. In this study, lead free Fe-Cu based powders with addition of elements such as tin, molybdenum disulfide and Nano boron nitride (BN) have been developed by powder metallurgy (PM) technique in order to improve the tribological and mechanical properties. The powder mixtures were compressed at a pressure of 500 MPa, and then sintered in dry hydrogen atmosphere at 900^{0}C for 50 minutes. The mechanical and tribological properties obtained due to addition of the said elements is presented in this study. The tribological behavior of the selected alloys is analyzed by reciprocating-sliding tests under dry conditions. The morphology of wear scars and the microstructure of the wear surfaces were investigated. The material with 2.5 wt.% of Sn exhibited the highest value of hardness, the material with 7.5 wt.% of Nano BN comparably shows the low coefficient of friction and wear rate as compared with 5 wt.% of Nano BN.

Keywords:
| Self-lubricating bearing | Fe-Cu alloy | Powder metallurgy | Friction | Wear |