



September 16-19, 2022 Shenzhen, China

Properties of Ni60/SiO2 coating prepared by the pyrolysis products of rice husk

Chunxue Wei, Hongbing Li

CMSE4711

Henan Light Industry Vocational College, Zhengzhou, 450002, China Corresponding E-mail:13526433960@163.com

MAIN RESEARCH CONTENTS

- The low-cost surface coating preparation technology using inexpensive rice husk as the research object was explored.
- The pyrolysis process behavior of rice husk was analyzed. The Ni60/SiO2 coating was prepared on the surface of the 45# steel substrate using the pyrolysis product SiO2 fiber as the reinforcing phase and supersonic plasma-spraying equipment.

EXPERIMENTAL METHOD

- $\checkmark \quad \text{The rice husk was pyrolyzed.}$
- An x-ray photoelectron spectroscopy (XPS) was performed on the pyrolysis products of rice husk.
- ✓ Raw materials and Sample were prepared.

EXPERIMENTAL RESULT



Figure 1. Microscopic morphology of Ni60/SiO₂ coating, (a) Suface (b) Suface local (c) Polished surface (d) Polished surface of Ni60



Figure 2. Phase structure of Ni60/SiO₂ coating









200µm

Figure 4. Friction coefficient and 3D wear morphology of Ni60/SiO₂ coating surface

Figure 5. Surface wear morphology of Ni60/SiO $_2$ coating surface

CONCLUSION

- An Ni60/SiO2 coating was prepared using a cheap, rice husk pyrolysis product, SiO2 fiber, as the coating reinforcement phase. The coating had no obvious defects such as cracks and pores.
- The nanohardness of the Ni60/SiO2 coating was 14.2 GPa, which far exceeded the hardness of the Ni60 coating. Meanwhile, the average friction coefficient was 0.42, which showed that the Ni60/SiO2 coating had better wear resistance.
- Under a load of 10 N, using the reciprocating friction process, the Ni60/SiO2 coating was mainly manifested as an abrasive wear mechanism.