

## Documents

Sulaiman, M.H.<sup>a</sup>, Farahana, R.N.<sup>a</sup>, Tajul, L.<sup>a</sup>, Jaafar, H.<sup>b</sup>

**The wettability characteristics of DLC coating for tribological engineering applications**

(2019) *IOP Conference Series: Materials Science and Engineering*, 670 (1), art. no. 012053, .

**DOI:** 10.1088/1757-899X/670/1/012053

<sup>a</sup> School of Mechatronic Engineering, Universiti Malaysia Perlis, Pauh Putra Campus, Perlis, Arau, 02600, Malaysia

<sup>b</sup> School of Manufacturing Engineering, Universiti Malaysia Perlis, Pauh Putra Campus, Perlis, Arau, 02600, Malaysia

**Abstract**

Hard coating deposited to tool steel surface can greatly improve wear resistance and reduce sticking. Since solid-liquid interactions are present in every lubricated tribological contact, the present study is aimed to understand the physical phenomena of contact interactions between the DLC coated surface and the liquid. In this study, double-layer DLC/TiAlN coating was prepared via Physical Vapour Deposition (PVD) process. The anti-sticking properties were assessed using contact angle measurements using two liquids with distinctly different viscosity - water and oil. No significant differences found in the contact angle values for both liquid properties. The results revealed that the DLC/TiAlN coated tool steel surfaces exhibit hydrophobic behaviour with high contact angle values. With a lower surface energy of the DLC/TiAlN coating in comparison to uncoated surface, this suggests that the DLC/TiAlN coating is a good hard coating candidate since it has a lower adhesion resistance and an improved release performance. © Published under licence by IOP Publishing Ltd.

**Funding details**

Taiho Kogyo Tribology Research Foundation TTRF9008-00015  
Universiti Malaysia Perlis 9009-00059

This work was supported by the Taiho Kogyo Tribology Research Foundation TTRF [grant number 9008-00015] and Short-term Grant Universiti Malaysia Perlis [grant number 9009-00059]. Special gratitude is dedicated to Tribology & Precision Forming (Tribo-Forming) research group for the fruitful discussions, equipment and technical assistance.

**Correspondence Address**

Sulaiman M.H.; School of Mechatronic Engineering, Universiti Malaysia Perlis, Pauh Putra Campus Malaysia; email: hafissulaiman@unimap.edu.my

**Editors:** Majid M.S.A., Jamir M.R.M., Choon T.W., Rahman A.A.

**Publisher:** Institute of Physics Publishing

**Conference name:** 6th International Conference on Applications and Design in Mechanical Engineering 2019, ICADME 2019

**Conference date:** 26 August 2019 through 27 August 2019

**Conference code:** 156586

**ISSN:** 17578981

**Language of Original Document:** English

**Abbreviated Source Title:** IOP Conf. Ser. Mater. Sci. Eng. 2-s2.0-85078304642

**Document Type:** Conference Paper

**Publication Stage:** Final

**Source:** Scopus

**Access Type:** Open Access