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Physical vapor deposition (PVD) coatings — Contact angle measurement of metallic hydrophobic PVD coatings

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Foreword

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Introduction

A hydrophobic surface is defined as a solid surface with a water contact angle higher than 90°. A hydrophobic surface tends to repel water droplets. Hydrophobic coatings have drawn much interest in electronic devices, aerospace engineering and construction industries. This is because of their self-cleaning, anti-icing and corrosion resistance properties. Among current hydrophobic coatings, polymer-based materials are the most commonly used due to their low surface energy. However, they are relatively soft with low durability when applied in harsh environments.

Metal-based hydrophobic physical vapor deposition (PVD) coating is a promising candidate for realizing the practical use of hydrophobic surfaces due to their outstanding mechanical durability. However, the surface wettability of metallic PVD coatings goes through a time evolution under ambient air exposure due to the adsorption of hydrocarbons. This makes it difficult to evaluate the wettability and apply this kind of coating for hydrophobic use. It is thus essential to evaluate how wettable metallic hydrophobic PVD coatings are for the further development and applications of metallic hydrophobic PVD coatings.