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**Barrier coatings on polyvinyl chloride (PVC) to prevent the migration of DEHP in medical products**

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Polyvinyl chloride (PVC) is widely used for medical purposes, e.g. in transfusion medicine to store blood products. Unfortunately, PVC only becomes flexible when plasticizers like bis(2-ethylhexyl) phthalate (DEHP) are mixed to the compound. As these plasticizers are not covalently bound to the polymeric matrix, their diffusion to the surface and leaching into lipophilic media is frequently observed. To suppress this effect a barrier against plasticizer migration should be applied to the material. In the present contribution two methods to establish a barrier layer on PVC are compared: plasma-enhanced chemical vapor deposition (PECVD) of thin films at atmospheric pressure [1] and gas-phase fluorination [2]. Dielectric barrier discharges (DBDs) were used to deposit thin films from hexamethyldisiloxane (HMDSO) using nitrogen or argon as process gases. Oxygen is added to tune film composition from an organic character to more inorganic – SiO<sub>2</sub>-like – films. It is observed, that oxygen has to be available in excess for the formation of thin films with high barrier properties, but, on the other hand, fully oxidized films are too brittle for a good barrier performance. In gas-phase fluorination the polymer is exposed to mixtures of fluorine and nitrogen [3]. A systematic process control (F<sub>2</sub> concentration, time, gas atmosphere) allows the fluorination process to be optimally adjusted to reducing migration of plasticizers. High fluorine concentrations as well as much less oxygen in the process increases the barrier efficiency of the PVC material.

[1] M. Cerezuela Barreto et al., Plasma Process. and Polym. 2012, 9, 1208

[2] Kharitonov, 2000, Journal of Fluorine Chemistry, 2000, 103, 123

[3] S. Mosch et al., Kunststoffe plast Europe, 2005, 2, 1

**Keywords**

barrier coating

DBD

plasticizer

gas-phase fluorination

DEHP