

Superhierarchical MOF Coating for Drop Condensation

Description

- The invention includes a procedure for the production of an omniphobic surface coating on construction parts, the surface coating itself as well as its application in heat exchangers.
- For the application in heat exchangers, the principle of drop condensation offers a considerably higher heat transfer coefficient than film condensation.
 - Up to now drop condensation was predominantly realized for water steam condensation – organic and non-aqueous fluids (e.g. solvents and refrigerants) are showing much less surface tension → complicated drop condensation and efficiency losses

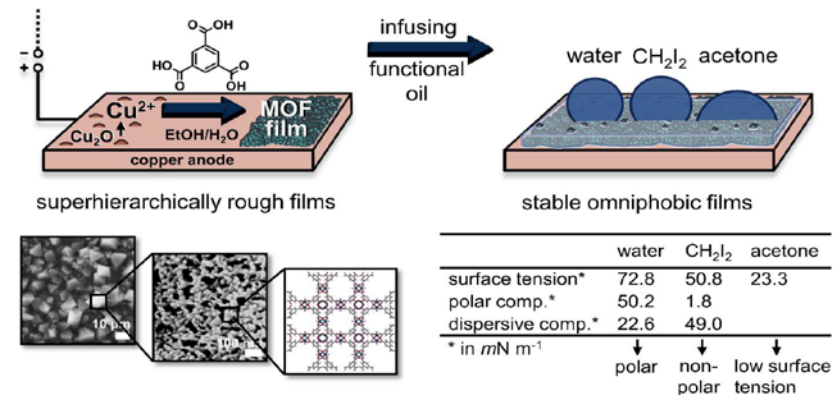
Solution

The procedure allows the coating of construction parts with an omniphobic surface coating in the main steps:

1. Application of at least one metal organic framework connection (MOF) by electrochemical capture directly on the construction part
2. MOF-coating applicable without additional functionalization
3. Application of impregnating agents with surface tension below 30 mN/m on the MOF-coating allows drop condensation of non-aqueous fluids

Benefits

- ✓ Increasing efficiency of of heat exchangers and devices → more compact design possible
- ✓ No additional processing
- ✓ No nano-structuring of surface necessary
- ✓ Coating procedure allows any construction geometry
- ✓ Industrial scalability
- ✓ Possible Applications:
 - stationary and mobile heat pumps, refrigerators
 - tube bundle heat exchangers
 - plate heat exchangers
 - recovery processes for organic solvents



Electrochemical capture of a porous MOF-coating as basis for a stabile omniphobic Impregnation