

Self-cleaning highly aqueous dispersed heat insulation functional coating for glass

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Nowadays, glazing materials have been widely used to replace conventional building envelopes for the purpose of aesthetic and daylighting in modern buildings. However, the large area glazing materials on roofs and curtain walls will introduce large amount of solar heat gain and lead to dramatic increase of electricity consumption and high energy use for spacing cooling. In addition, if not being cleaned frequently, the glass accumulates dust and influence its aesthetic. Our research group has been working on the technical development and application of transparent functional coatings on glazing windows for window self-cleaning and window thermal blocking. We would like to propose two different types of functional coatings, as below:

1. Heat blocking:

- blocking most infrared radiation and UV light.
- Over 80% transmittance
- Reducing solar heat gain through local glazing windows and energy use by over 40%
- Hardness 6H and long aging test
- Coating methods: Roller coating, spray coating

2. Super-Hydrophilic self-cleaning:

- Small contact angle; over 98% in visible region.
- Photocatalysis to break down the organic grime into CO₂ and water
- 6H hardness and long lifespan
- Coating methods: printing, spray



Patents:

- 一種基於鈉鎢青銅的自清潔納米隔熱塗料製備方法 (PRC, Filed, Filing No. 01710395687.7, Filing date: 25 May 2017)
- Cesium Tungsten Bronze-based self-cleaning nano heat-insulation coating material and preparation method (US20180340082, Published on 29.11.2018)
- Wang Yuanhao, H Yang and L Lu: 染料敏化太阳能电池专用丝网印刷浆料的制备方法(申请号: 201010564588.5)

Awards:

- 2017 TechConnect 2017 Global Innovation Award, U.S.A.
- 2017 Hong Kong Green Innovations Awards, Certificate of Merit
- 2017 PolyU FCE Dean's Award for Outstanding Achievement in Technology Transfer 2017
- 2016 Special Merit Award (R. Alekseev Award) and Gold Medal, 44th International Exhibition of Inventions of Geneva, Switzerland
- 2014 Hong Kong Green Building Award 2014 with a Merit Award in Building Products and Technologies Category

Job Reference (Hong Kong)

- Heat insulation coating on skylights windows and thermal performance testing - MetroCity Plaza Phase II (Henderson Land)
- Pilot project of applying heat insulation coating and self-cleaning coating on south-east windows and thermal performance testing – Hip Shing Hong Kowloon Centre
- The pilot project of applying heat insulation coating on windows in Landmark North