

**RSC Surface Coatings Poster Competition - Sustainable Coatings for the Future**

This document contains resources for each topic area to guide and aid you in your submission.

The competition is open from **1st September 2024 to 31st January 2025.** Submissions received after the 31st January 2025 will not be entered into the competition.

Below you will find links for each topic area alongside links to the more general aspects of the science of coatings. We have provided a number of links as a resource on the topics so you can find one or two that you may follow up and build on. Please note the resources provided are external websites and therefore the **RSC is not responsible** for any content on these sites.

**Topic 1 – How coatings can contribute to energy savings in buildings.**

***General introductory material***

* [Can cool coatings combat climate change? (acs.org)](https://cen.acs.org/business/specialty-chemicals/cool-coatings-combat-climate-change/101/i35)
* [Developing Sustainable Coatings (noble.ai)](https://www.noble.ai/resources/developing-sustainable-coatings)
* [Transparent Solar Panels: The Future of Sustainable Energy (solarsme.com)](https://solarsme.com/transparent-solar-panels-the-future-of-clean-and-sustainable-energy/)
* [Transparent solar panels could replace windows in the future. Here's how (interestingengineering.com)](https://interestingengineering.com/innovation/transparent-solar-panels-replace-windows-in-the-future-heres-how)
* [How do metal coatings on solar panels influence their heat dissipation properties? | ProPlate®](https://www.proplate.com/how-do-metal-coatings-on-solar-panels-influence-their-heat-dissipation-properties/)

***Research papers and books***

* <https://www.mdpi.com/2071-1050/9/12/2319>
* <https://www.researchgate.net/profile/Anna-Laura-Pisello/publication/313881594_state-art-cool-coatings/data/58ad688292851c3cfda158fe/state-art-cool-coatings.pdf>
* <https://iopscience.iop.org/article/10.1088/1757-899X/585/1/012036/pdf>
* <https://repositorio-aberto.up.pt/bitstream/10216/137979/2/503650.pdf>
* [Thermal comfort and energy saving of novel heat-storage coatings with microencapsulated PCM and their application - ScienceDirect](https://www.sciencedirect.com/science/article/abs/pii/S0378778821006332)
* <https://www.taylorfrancis.com/chapters/edit/10.1201/9780367567699-13/review-energy-conservation-building-applications-thermal-storage-latent-heat-usi>
* [Energy Saving Coating Materials | ScienceDirect](https://www.sciencedirect.com/book/9780128221037/energy-saving-coating-materials)

**Topic 2 – Bio-based coatings and inks.**

***General introductory material***

* Series of You Tube videos from a company aiming to produce bio-based coatings: [#1 | What is a BIO coating? | ICA Group - YouTube](https://www.youtube.com/watch?v=3rnMub4s56Y)
* [Seaweed provides better paints and varnishes | NEXT1KOAT Project | Results in brief | FP7 | CORDIS | European Commission (europa.eu)](https://cordis.europa.eu/article/id/170130-seaweed-provides-better-paints-and-varnishes)
* [Bio-based coatings overview: Increasing activities - News and insights for the European coatings industry (european-coatings.com)](https://www.european-coatings.com/news/markets-companies/bio_based-coatings-overview-increasing-activities/)
* <https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiYv6yjkIiHAxWdcUEAHR7gDGcQFnoECC8QAQ&url=https%3A%2F%2Fwww.paint.org%2Fwp-content%2Fuploads%2F2023%2F04%2FBiobased-Coatings_MayJune-2022.pdf&usg=AOvVaw0h667sz3JClmKmsGF2RcDK&opi=89978449>

***Research papers***

* [Biobased furan-based epoxy/TiO2 nanocomposites for the preparation of coatings with improved chemical resistance - ScienceDirect](https://www.sciencedirect.com/science/article/abs/pii/S1385894720332344)
* [A lignin-based epoxy/TiO2 hybrid nanoparticle for multifunctional bio-based epoxy with improved mechanical, UV absorption and antibacterial properties - ScienceDirect](https://www.sciencedirect.com/science/article/abs/pii/S0141813022009527)
* [Sustainable Lignin-Based Coatings Doped with Titanium Dioxide Nanocomposites Exhibit Synergistic Microbicidal and UV-Blocking Performance toward Personal Protective Equipment | ACS Sustainable Chemistry & Engineering](https://pubs.acs.org/doi/abs/10.1021/acssuschemeng.1c03637)
* [Fully Biobased Photothermal Films and Coatings for Indoor Ultraviolet Radiation and Heat Management | ACS Applied Materials & Interfaces](https://pubs.acs.org/doi/10.1021/acsami.2c00718)
* [An overview of green processes and technologies, biobased chemicals and products for industrial applications - ScienceDirect](https://www.sciencedirect.com/science/article/abs/pii/S2452223623000810)

**Topic 3 – How coatings or inks can extend the life of products/buildings.**

***General introductory material***

* [Essential Coatings (youtube.com)](https://www.youtube.com/watch?v=vJtdhMwLpi4&t=13s)
* [A World Without Coatings (Subtitles) (youtube.com)](https://www.youtube.com/watch?v=CWxpx55uQa0)
* [Developments in smart organic coatings for anticorrosion applications: a review | Biomass Conversion and Biorefinery (springer.com)](https://link.springer.com/article/10.1007/s13399-022-02363-x)
* [Why Should Metal Coatings Be Used in the Construction Industry? (alphatek.co.uk)](https://www.alphatek.co.uk/why-should-metal-coatings-be-used-in-the-construction-industry/)
* [Explore the World of Paints, Coatings & Surface Protection (onropes.co.uk)](https://www.onropes.co.uk/exploring-the-world-of-paints-and-coatings)

***Research papers***

* Self-healing self-reporting coatings for corrosion protection: https://www.sciencedirect.com/science/article/pii/S1385894720339735
* [Applied Sciences | Free Full-Text | Environmentally Friendly Anticorrosive Polymeric Coatings (mdpi.com)](https://www.mdpi.com/2076-3417/11/8/3446)
* [Developments in smart organic coatings for anticorrosion applications: a review | Biomass Conversion and Biorefinery (springer.com)](https://link.springer.com/article/10.1007/s13399-022-02363-x)
* [Functional and smart coatings for corrosion protection: A review of recent advances - ScienceDirect](https://www.sciencedirect.com/science/article/abs/pii/S0257897214005428)
* [Graphene: The Thinnest Known Coating for Corrosion Protection | JOM (springer.com)](https://link.springer.com/article/10.1007/s11837-014-0921-3)

**Non-topic Specific links**

***General***

* [Sustainability | Free Full-Text | Sustainable Coatings on Metallic Alloys as a Nowadays Challenge (mdpi.com)](https://www.mdpi.com/2071-1050/13/18/10217)

***Climate change***

* [Can cool coatings combat climate change? (acs.org)](https://cen.acs.org/business/specialty-chemicals/cool-coatings-combat-climate-change/101/i35)

***Photovoltaics***

* [Transparent Solar Panels | GreenMatch](https://www.greenmatch.co.uk/blog/2015/02/transparent-solar-panels)
* [Transparent solar cells | MIT Energy Initiative](https://energy.mit.edu/news/transparent-solar-cells/)
* [Transparent Solar Panels: Reforming Future Energy Supply (solarmagazine.com)](https://solarmagazine.com/solar-panels/transparent-solar-panels/)
* [A review of transparent solar photovoltaic technologies - ScienceDirect](https://www.sciencedirect.com/science/article/pii/S1364032118304672)
* [(26) Transparent Solar Panels: A Technological Overview | LinkedIn](https://www.linkedin.com/pulse/transparent-solar-panels-technological-overview-jahagirdar-sanjeev-7bqqf/)

***Metal coatings***

Thermal storage coatings:

* <https://www.sciencedirect.com/science/article/abs/pii/S1364032119307877#:~:text=The%20results%20show%20that%20incorporating,application%20in%20>
* <https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjFwcGyuYaHAxUMUEEAHbOiA8kQFnoECCwQAQ&url=https%3A%2F%2Fresearchonline.ljmu.ac.uk%2F21870%2F1%2FA%2520Review%2520of%2520Recent%2520Improvements%2520Developments%2520and%2520Effects%2520of%2520Using%2520Phase%2520Change%2520Materials%2520in%2520Buildings%2520to%2520Store%2520Thermal%2520Energy.pdf&usg=AOvVaw1XhLDdjaoEJMQ-nl98zIqX&opi=89978449>

Thermochromic coatings:

* [Investigating the energy saving potential of thermochromic coatings on building envelopes - ScienceDirect](https://www.sciencedirect.com/science/article/pii/S0306261921002920)
* <https://www.scientificamerican.com/article/new-color-changing-coating-could-both-heat-and-cool-buildings>
* [The MAGIC of THERMOCHROMIC Pigments (Heat Sensitive Color Changing) (youtube.com)](https://www.youtube.com/watch?v=NiHi1jfrWhs)

Thermal insulation coatings:

* [CoatingsTech - February 2022 - Thermal Insulation Coatings: Controlling Heat Flow with a Functional Coating (coatingstech-digital.org)](https://www.coatingstech-digital.org/coatingstech/february_2022/MobilePagedArticle.action?articleId=1767309&app=false#articleId1767309)

**General and ‘Fun’ Links**

* [The magic of Thermachromic Pigments (Heat Sensitive Colour Changing) (youtube.com)](https://www.youtube.com/watch?v=NiHi1jfrWhs)
* Smart inks: [Insignia Embedded Colour Changing Labels (youtube.com)](https://www.youtube.com/watch?v=k0kpOoe-42g), [Insignia (insigniatechnologies.com)](https://www.insigniatechnologies.com/) An indicator label that tells you how long a food product has been exposed to air and when it should be consumed.
* Showcase of a range of coating technologies: <https://www.youtube.com/watch?v=pQYJPB4VTuQ>
* British Coatings Federation: <https://coatings.org.uk/>? and ‘sustainability’ links.

e.g. <https://www.youtube.com/watch?v=EkVrRBzh3eU>

* American Coatings Association: <https://www.paint.org/coatingstech-magazine/articles/an-update-on-sustainability-in-the-coatings-industry/>
* World Coatings Council: <https://worldcoatingscouncil.org/WCC-Sustainability-Report/index_20.html#page=5>
* Coatings World: <https://www.coatingsworld.com/issues/2016-11-01/view_features/coating-the-way-to-sustainable-solutions/>