



Advanced Coating Technologies



Hydrophilic
Coatings

Antimicrobial
Coatings

Hemocompatible
Coatings

Hemocompatible Coating Technology

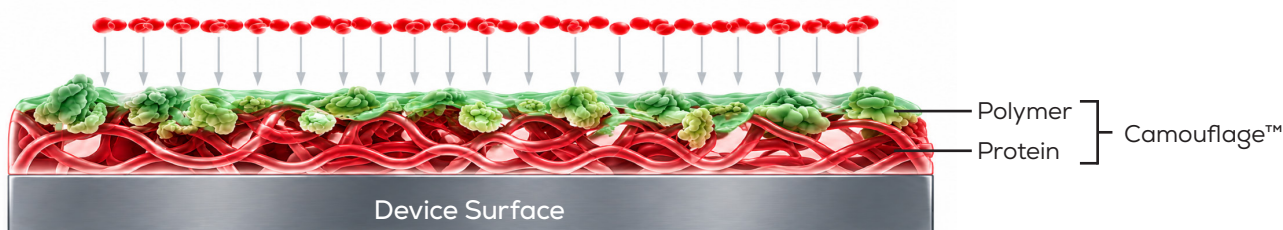
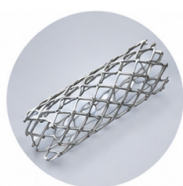
- Reduces clotting
- Reduces inflammation
- Promotes healing
- Longer-term durability

Coating Description

Camouflage™ is an innovative coating technology designed for blood-contacting medical devices. It is applied using a water-based process that requires no UV or heat curing and adheres to metals, polymers and ceramics. As a non-pharmaceutical coating, Camouflage™ enables a shorter regulatory pathway.

Mechanism of Action

Camouflage™ combines recombinant protein with synthetic polymeric chemistry to regulate proteins adsorption onto the device surface. This conceals the device beneath a layer of non-inflammatory proteins drawn from the blood itself. This supports a reduction in thrombosis and provides a foundation for endothelial cell attachment.



Neurovascular



Cardiovascular



Structural Heart



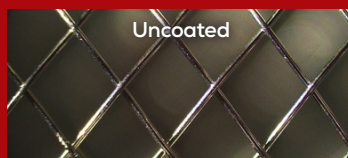
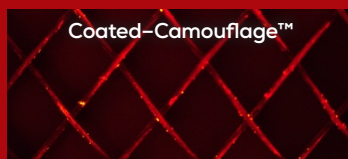
Electrophysiology



Perfusion / Dialysis

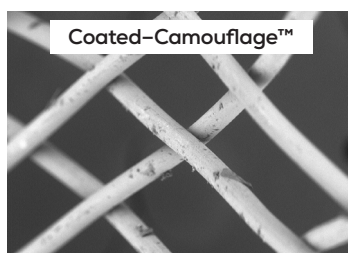
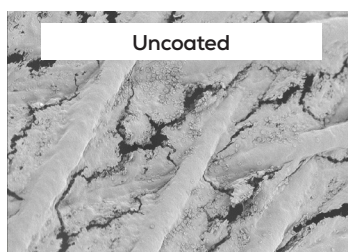
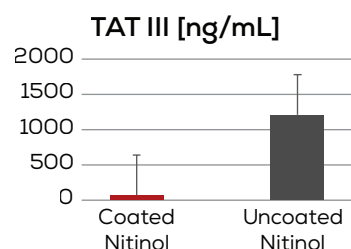
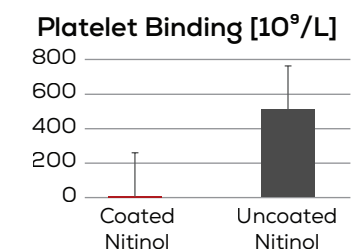
Characterization

Camouflage™ is an ultra-thin, conformal coating (5-10 nm) that integrates seamlessly with the device surface. The coating is stable, with strong chemical composition and robust coating-substrate bonding. Coating coverage can be readily assessed and characterized using fluorescent microscopy.



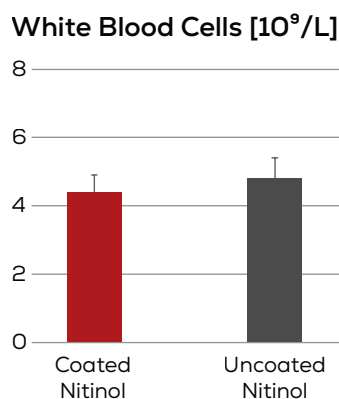
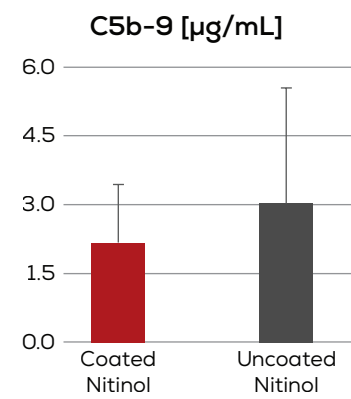
Hemocompatibility

Camouflage™ coating is designed to passivate the surface, reduce platelet activation and inhibit the coagulation cascade. SEM images of nitinol flow diverters following ISO 10993-4 hemocompatibility testing demonstrated minimal deposition of blood components on the coated surface. In contrast, the uncoated surface was covered by a fibrin mesh with adhered platelets. Reduced mean TAT III levels and platelet binding was observed on Camouflage™ coated nitinol surfaces, demonstrating enhanced hemocompatibility.



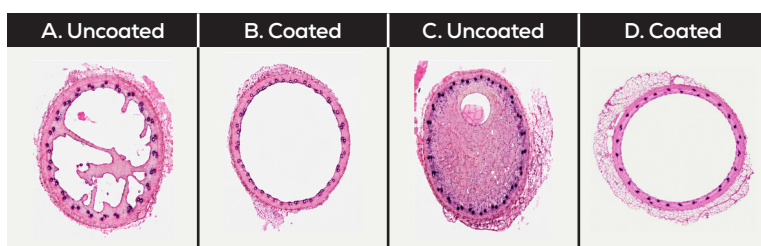
Anti-inflammatory

Camouflage™ coating does not introduce inflammatory interactions at the blood- device interface. On nitinol substrates, white blood cell count and C5b-9 levels remained comparable to baseline. C5b-9 is a marker used to assess complement activation. Together, these results indicate no measurable inflammatory or complement response under 10993-4 testing conditions.



Endothelialization

Rabbit carotid artery @ 30 & 90 days after implantation of uncoated and Camouflage™ coated flow diverters. (A) 30-day uncoated: neointimal protrusions & luminal bridging. (B) 30-day Camouflage™ coated: patent lumen. (C) 90-day uncoated: near-complete vessel occlusion. (D) 90-day Camouflage™ coated: patent lumen.



Histological cross-sections of nitinol flow diverters

Hydrophilic Coating Technology

- Low friction
- Low particulate release
- Durable coating
- Improved trackability

Coating Description

Smart Reactors hydrophilic coatings are engineered to create a stable, lubricious surface that rapidly hydrates in physiological conditions. The coating reduces friction, minimises particulate generation and enhances device trackability.

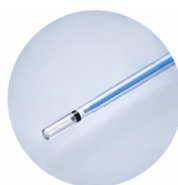
Our hydrophilic coatings are biocompatible, durable and can be tailored to meet the specific requirements of a wide range of medical devices.



Ophthalmology



Guidewires



Catheters



Urology



Sheath and
introducers



Coating Application



Friction Testing

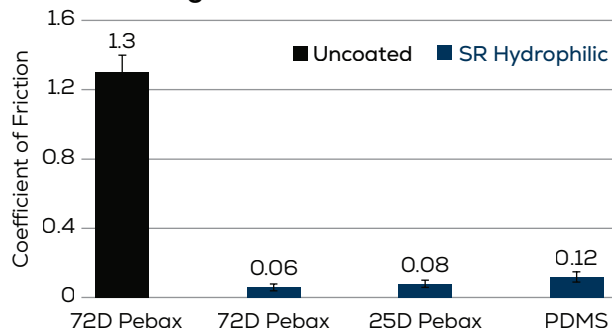


Particulate Testing

Friction Performance

Smart Reactors hydrophilic coatings significantly reduce friction, enabling smoother device delivery and improved navigability. Testing shows consistent low friction across a range of catheter substrates under simulated physiological conditions.

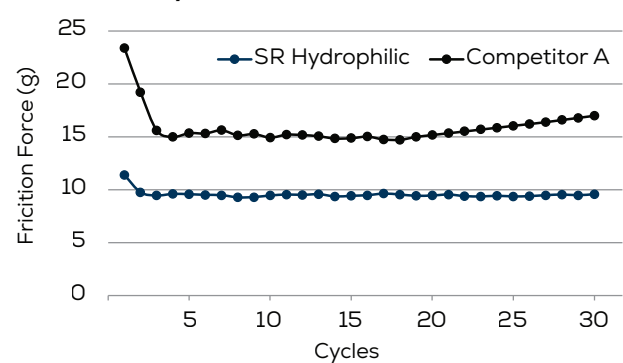
Friction Testing of Catheter Substrate Materials



Durability

Durable coatings minimize friction, reduce tissue trauma, prevent coating delamination and particulate generation. Testing with Smart Reactors hydrophilic coatings show consistent performance over more than 30 friction cycles under simulated biological conditions.

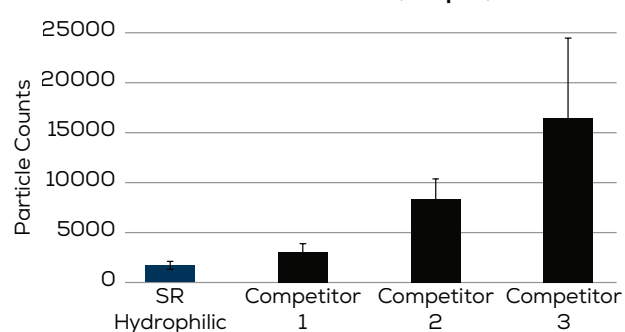
Durability of Coated Catheter Substrate



Low Particulate

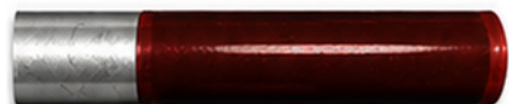
The hydrophilic coating minimises particulate generation, reducing the risk of downstream embolic events and improving device safety. Testing confirms low levels of particulate release compared to competitor coatings.

Particulate Release (>10µm)



Coating Coverage

The hydrophilic coating provides uniform and complete surface coverage, ensuring consistent lubricity and device performance across complex geometries.



Even coating coverage on device surface

Antimicrobial Coating Technology

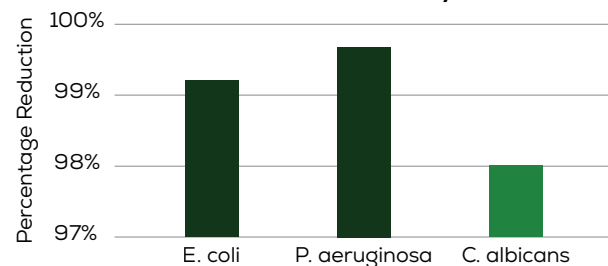
- Broad antimicrobial activity
- Long lasting efficacy
- Resists biofilm formation
- Supports safer devices

Coating Description

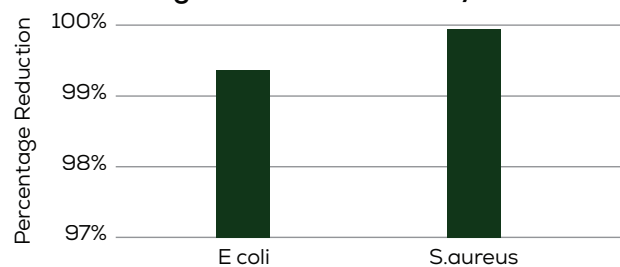
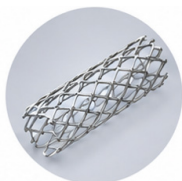
Smart Reactors antimicrobial coatings provide broad-spectrum protection against bacteria, fungi and other microorganisms. Our coatings provide passive antimicrobial activity by disrupting microbial cell membranes, helping to reduce the risk of device-related infections.

The coatings are biocompatible and durable and can be tailored to meet the specific requirements of a wide range of medical devices. They can also be customized to incorporate additional functionalities, such as hemocompatible properties, where required.

Antimicrobial Efficacy



Ag Antibacterial Efficacy



Implantable



Urology



Wound Care



Orthopedic



Dental Implants



Smart Reactors Ltd is a leader in advanced medical device coating technologies. The company provides innovative surface solutions for medical devices, worldwide. The portfolio of biocompatible coatings is designed to address key challenges in medical device performance, including thrombogenicity, healing, friction and microbial contamination. The range of products include hemocompatible, hydrophilic and antimicrobial coatings. Tailored solutions can be developed as required, based on customer unmet needs and design specifications.

Our Services



Design &
Development



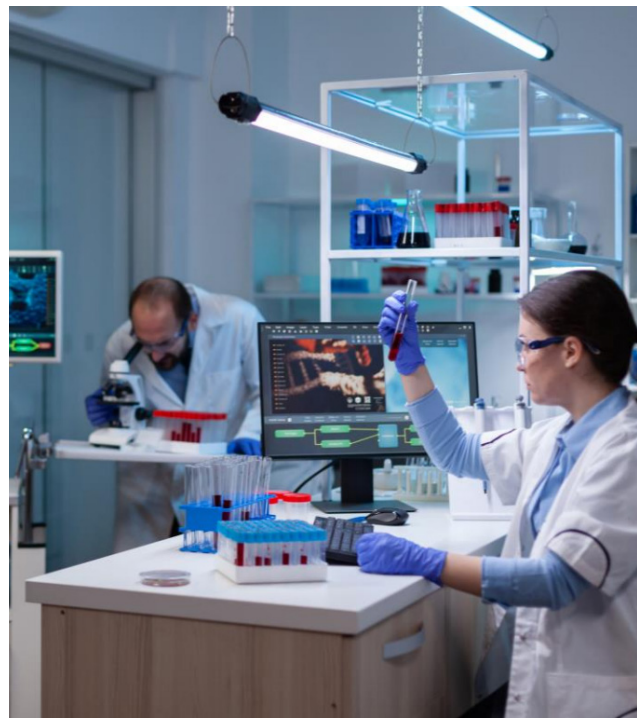
Prototype
Testing



Manufacturing
Transfer



Aftersales
Support



Our Approach

Smart Reactors takes an end-to-end approach to medical device coating development, working with medical device manufacturers from initial feasibility through to technology transfer and ongoing supports. The process begins with an initial feasibility trial to identify and develop the most suitable coating parameters based on specific device, material and geometry. Coated prototypes are provided to the customer for durability, in vitro and application-specific testing. The business model further supports technology transfer and scale-up, to the preferred sub-contractor's site.

Quality & Regulatory

Smart Reactors operates to ISO 13485 QMS and provides regulatory support to its customers at each stage of the collaboration. The novel innovation created within the company is managed to the highest levels with end-end traceability, safety and performance requirements at the forefront.

Our History

Founded in 2019, Smart Reactors is headquartered in Galway, Ireland, with a growing network of collaborators worldwide. The company brings together extensive medical device expertise, led by CEO Brian Haddigan, with >30 years of medical device commercial experience. Mark Brassil (CTO) has >20 years of medical device R&D experience, in particular chemistry and biomaterials. Together, this expertise supports the continued growth and development of novel coating technologies to respond to real clinical needs.



510(k) CLEARED
EXTRACORPOREAL
CPB TUBING

Smart Reactors' Camouflage™ Coated Extracorporeal Cardiopulmonary Circuit Tubing has received FDA 510(k) clearance and is indicated for use during cardiopulmonary bypass (CPB) procedures for up to six hours.

SmartReactors

Medical Device Coatings



+ 353 91 456 324



www.smartreactors.com



info@smartreactors.com

Block 15, Galway Technology Park,
Galway, H91 AYOY, Ireland



Smart Reactors
Follow us on LinkedIn

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