



KINECTRICS

Industrial Innovation Accelerator

Advanced Materials Development and
Tailored Technical Solutions



Contract Research and Development Services

Our team is a multi-disciplinary company that carries out advanced materials development and assessment. We are primarily innovators who solve extraordinary challenges on behalf of our industrial clients. We apply a range of advanced technologies and big data techniques to deliver both routine and truly ground breaking solutions.

ADVANCED MATERIALS

With our expertise in polymer science and engineering we have developed advanced nanocomposites and polymer blends to replace insulation for high voltage power cables. We have also developed self-healing technology that can prolong the life of HV cables.

ADVANCED POLYMER BLENDS

As technologies advance, so do the requirements for the materials used. Foreseeably, there is a risk that existing materials in your supply chain no longer meet your future requirements in terms of performance. Not tackling this issue can cause an unacceptable delay in your product pipeline. Kinectrics can work with you to create material selection options by customising your materials to achieve targeted performance enhancements.

Kinectrics has extensive experience in producing polymer blends, using our laboratory scale solution reactors, melt extruder and compounders. We have produced reliable polyolefin blends with excellent electrical performance and improved mechanical properties for use in the electrical cable applications. In addition to the blend components, additives, such as antioxidants and stabilisers, should also be considered to make the materials fit for purpose.

Kinectrics have successfully moved lab-scale materials through to scale up to pre-commercialisation production volumes in a number of projects.



NANOCOMPOSITE MATERIALS

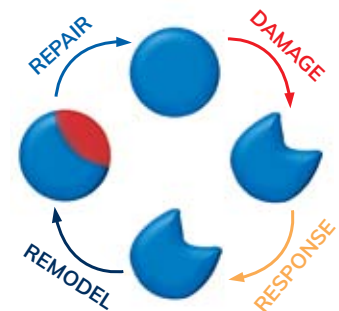
The addition of nanomaterials to polymers has been shown to have a positive effect on the materials properties. At the nanoscale, materials behave very differently compared to their larger scale counterparts. Their behaviour is influenced by physical parameters, such as particle shape, size and size distribution and also surface characteristics.

We can work with you to understand how to control these parameters and get the additional functionality you require, consistently. Kinectrics has experience successfully applying nanomaterials to polymer systems achieving property enhancement. We understand the challenges and trade-offs of applying this new technology and will be able to quickly access its applicability for your materials.

Kinectrics' methods of characterisation for nanocomposites have also been successfully used to produce new resin-based formulations with defined chemical and physical characteristics. These systems have been scaled to component production volumes and their properties and performance verified.

SELF-HEALING MATERIALS

The outer protective sheath of a cable is key to ensuring a long life for the cable. Any damage can lead to water entry and cable failure. The ability for a cable to naturally heal itself, re-establishing the waterproof barrier and avoiding catastrophic failure, is now possible.



Asset Management

Our team are experienced in many aspects of Asset Management. From the characterisation and assessment of materials condition, to end of life or remaining life span estimation we can apply our methods to our client's particular circumstance. We have the tools to enable us to calculate life cycle environmental impacts and to offer options for improvements to existing assets. Alternatively, we have materials development programmes that can feed into existing Assets and systems to offer innovative changes to Asset Management.

SELF-HEALING INSULATION FLUIDS

Fluid-filled and pipe cables were once commonplace before the advent of extruded polymeric cable technology. These older cables remain important operational assets that are difficult to replace economically. Because they are old, they are prone to leak with costly environmental and economic consequences. Kinectrics has developed a self-healing oil that has all the insulating properties required but on contact with air, will solidify to stem the leak.

Anagen™

Anagen™ is a self-healing fluid (SHF), developed and licensed by Kinectrics. Anagen demonstrates the following unique properties:

- Seals leaks caused by cable damage.
- Reduces the loss of oil from the network.

When exposed to air/oxygen the catalyst in the Anagen™ causes the SHF to become a gel rather than a fluid. This gel then seals the leak. This is a significant environmental and cost saving asset to the power industry.



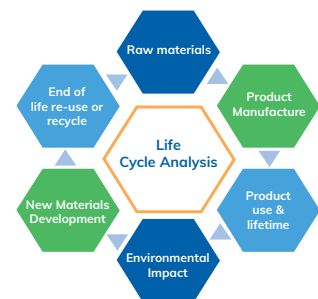
FORENSIC CABLE ANALYSIS

Kinectrics have the in-house capability for forensically analysing cables as part of our service offering to the cable community. This capability was created as part of our process for developing new advanced insulating materials. For our clients, we typically analyse cable samples of failed or prototype cables down to a molecular level. We have developed our own chemometrics technique (Transchem™) for this type of analysis, our knowledge is leading edge and world class.



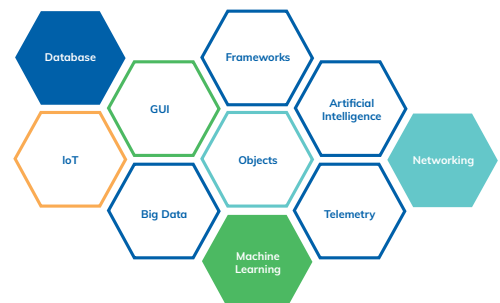
LIFE CYCLE ASSESSMENT

The practice of using Life Cycle Assessments (LCA) has been established for many years. To assign all the environmental effects created by products, assets and operations can be very complex. Knowledge and experience are key to providing a sound assessment. We have readymade tools that enable us to create unique insights into your life cycle performance. LCAs are increasingly used for by our clients for economic, social and corporate responsibility reasons.



SOFTWARE DEVELOPMENT

We are often manipulating large data sets derived from our analysis methods. To analyse this by hand would be time consuming, costly and lead to inaccuracies. Many years ago, we recognised the need for automation and therefore employ a team of software engineers that code and standardise our analysis techniques.





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