



WEARPLEX Beta Workshop: Soft Skin-Electrode Interface



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IDUN Technologies- Intro

2019 – DRYODE™ Alpha



- Reusable, soft biopotential electrode for ECG & EMG
- Silicone-based
- Manufacturing outsourced

2020 – DRYODE™ Helios

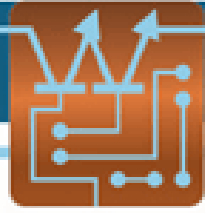


- Reusable, flexible EEG electrode for scalp
- **New, solvent-based Ink formulation**
- Scalable manufacturing process

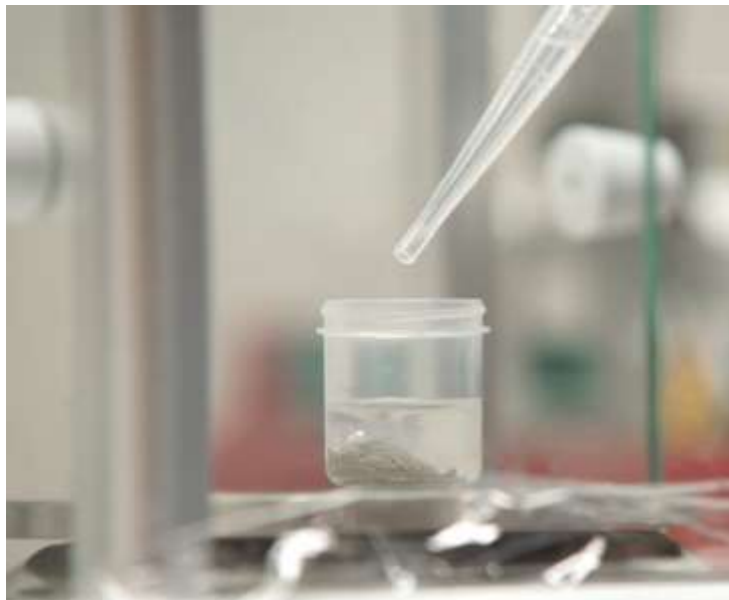
From 2021 – DRYODE™ Guardian



- Reusable, soft in-ear EEG electrode
- Unobtrusive
- Full-stack product with electronics/hardware & brain analytics platform



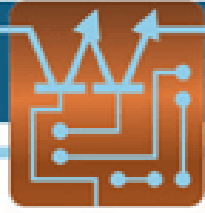
Soft and Flexible Conductive Materials at the Skin-Electrode Interface for Biopotential Recording and FES



IDUN DRYODE™ Ink

- » Suitable for biopotential recordings on the body such as EEG, EMG ECG as well as Functional Electrical Stimulation (FES)
 - » Dry contact
 - » High electrical conductivity
 - » Soft and flexible → Skin conforming, comfortable
- » Processing/Integration
 - » Suitable for different deposition methods, e.g. Screenprinting, viscosity can be adjusted
 - » Good adhesion to various substrates
 - » Scalable
- » Biocompatibility
 - » ISO 10993-5 Cytotoxicity
 - » ISO 10993-10 Skin irritation

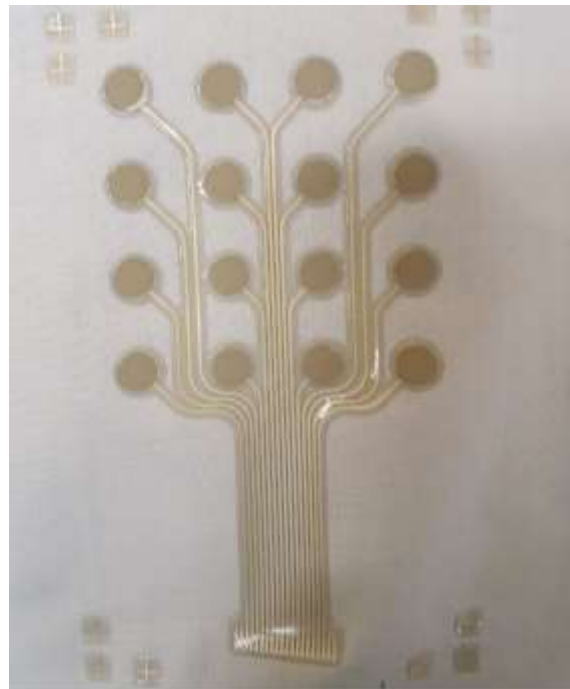




DRYODE™ Inks for WEARPLEX



TECSR Printed Film Substrate with IDUN Stimulation Skin-Electrode Interface

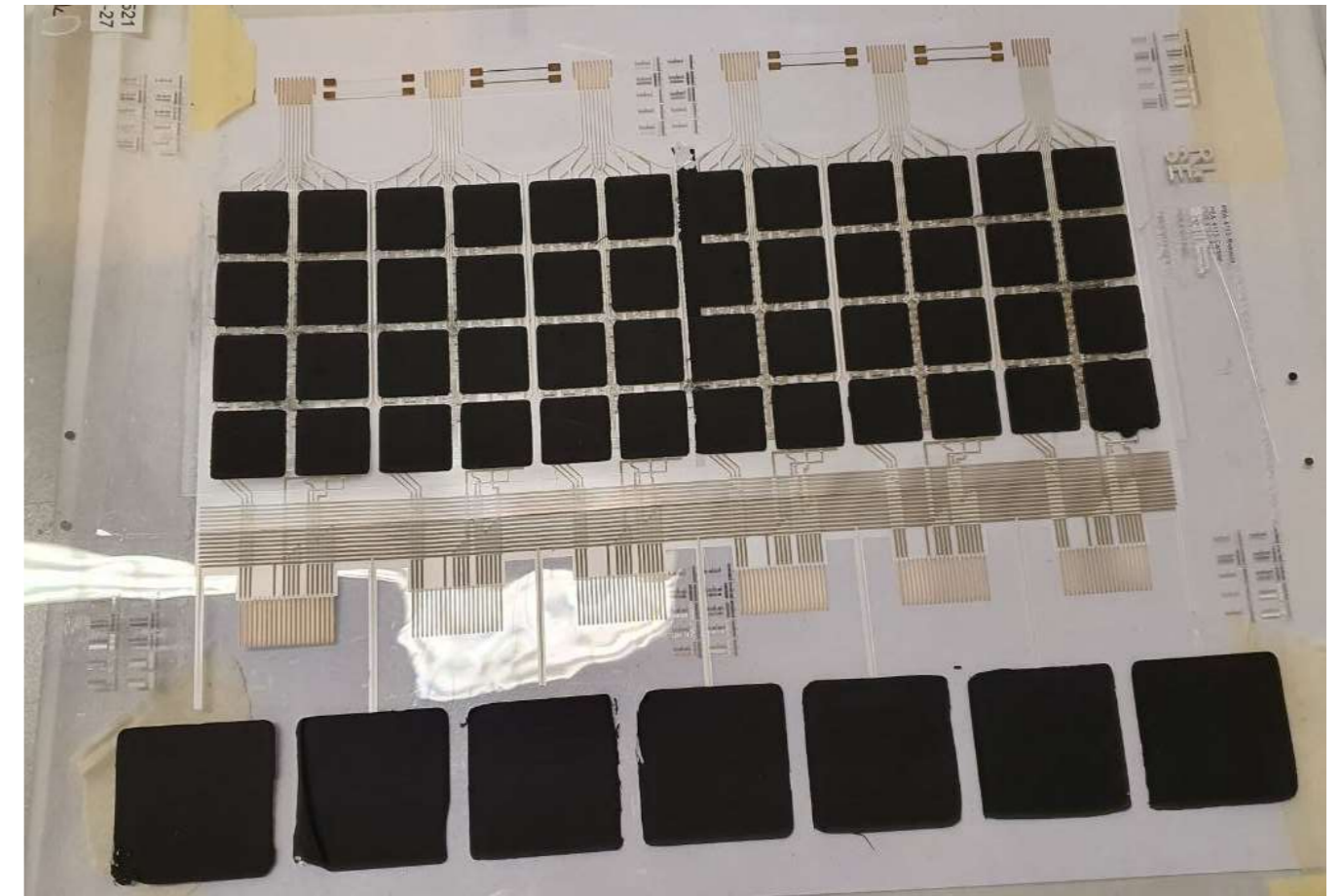


UoS printed Textile Substrate with IDUN Recording Skin-Electrode Interface

Two Ink formulations based on the same binder system were optimized:

- » Black Skin-Electrode Interface for stimulation
 - » Stimulation tests by TECSR
- » Grey Skin-Electrode Interface for recording
 - » EMG measurements by AAU

- » Relevant Suitable Substrates
 - » Printed Film Electrode Arrays from RISE and TECSR
 - » Printed Textile Electrode from UoS and RISE



Printed RISE Stimulation Array with IDUN Stimulation Skin-Electrode Interface



Future developments of the Skin-Electrode Interface Material

- » A dual purpose Skin-Electrode Interface Material
 - » Optimized for both recording and stimulation
 - » Optimized for large-scale, industrial production with state of the art processes
 - » 3D shape:
e.g. Injection molding
 - or
 - » 2D shape:
Film production (e.g. slot die) followed by Roll-to-Roll punching of flat electrodes and thermal lamination onto printed Electrode Arrays

