Trinity College Dublin

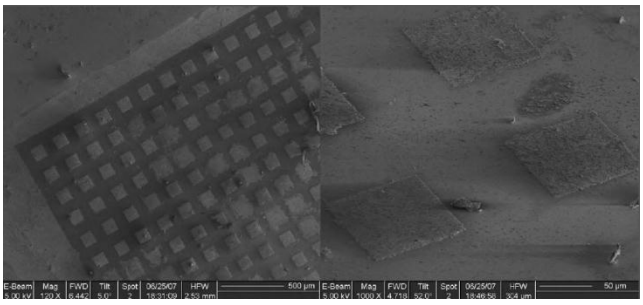
MASKLESS PATTERNED ELECTROPLATING.

Available for License

Basic overview

This technology uses magnetically enhanced electrolysis to produce **patterns** on magnetic materials **without the need for a mask**.

This novel technique, developed by CRANN researchers in Trinity College Dublin, gives **controlled location deposition** which can be structured in complementary patterns of lines and/or dots when a strongly paramagnetic but nonelectroactive cation is present in the electrolyte.



SEM micrographs of electrodeposited Co square arrays.

The opportunity

This technology is currently in lab-scale prototype stage and we are seeking industries interested in licensing this technology or a development partner to scale-up and test the system.

Also, as there are a significant number of broad market opportunities it may also be suitable for a start-up company.

Applications

Industries that may benefit from this technology include the semiconductor and medical device sectors.

Specific applications include:

- Patterned metal plating/coating of thin layers
- Controlled location deposition

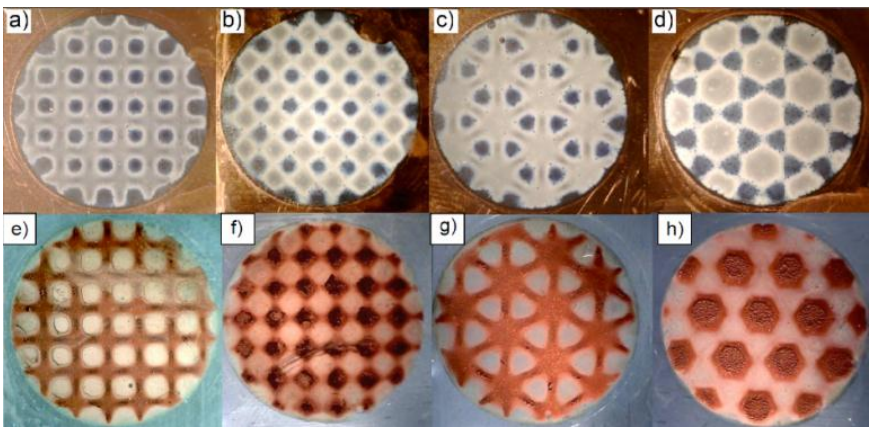
Technology and Patent Status

The core technology behind this technique uses magnetic fields to improve the mass transport in the electrochemical cell, influencing the relation between cell voltage and current density.

Considerable know-how is employed to perfect this technique and this may be licenced to interested parties.

Advantages

- **Small feature size** – potentially down to 10s of µm.
- **High throughput** – increased deposition rate .
- **Room temperature operation** - save cost of heating electrolyte.
- Reduced requirement for additives.
- Magnetic fields can structure electrodeposits of both paramagnetic and diamagnetic ions.
- Deposition of **structured arrays of dots 80 µm** in size.
- Minimum modification required to existing plating baths.



Top row: Electrodeposited patterns achieved using magnet arrays.
The arrays are a) square parallel, b) square alternating, c) hexagonal parallel and d) hexagonal alternating arrangements.
Bottom row: More electrodeposits under different conditions. The magnet arrays are d) hexagonal pair-wise alternating, e) square alternating, f) hexagonal parallel and g) hexagonal alternating.

Inventors: Prof. Michael Coey
Contact: Brendan Ring, Commercialisation Manager, CRANN Institute
✉ brendan.ring@tcd.ie

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