Gravure Printing of Metal N-Inks

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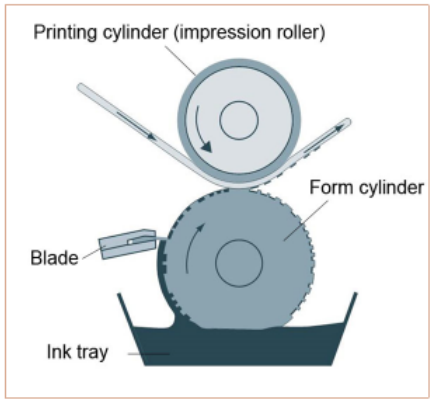
Background:

- Gravure printing: Transfer inks into small wells engraved into the surface of a cylinder.
  - Rapid characterizations
  - Can be layered
  - Faster than aerosol method
  - When layered substrate can exhibit properties of inks
- a cylinder with 'wells' rolls through an ink tray
- The ink is picked up, excess removed
- Pressed against a substrate

- Technique introduced in the first half of the 15th century in Germany
- Invented by Karel Klíč

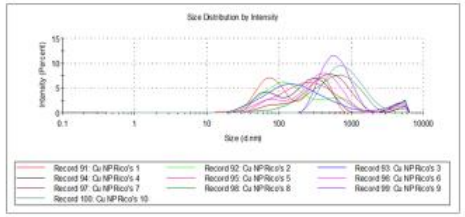


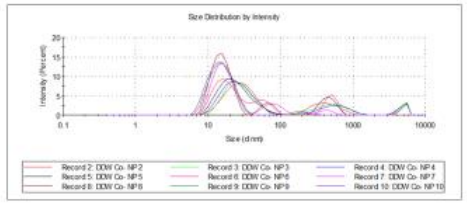
Objectives:

- Synthesize precursors for precursors.
- Convert those to nanomaterials (good ones).
- Synthesize/convert them into N-inks (useful ones).
- Gravure print with mix metal N-inks (first!!)
- Mix the different metals to print complex patterns.

Solution Precipitation (SPPT)

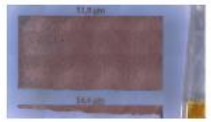
Results:





- The prints are promising
- Shows that the ink formula for aerosol printing
- Ink needs to be more disperse to fill all the wells
- Shows we are able to print magnetic elements

Copper print



Cobalt print

Summary/ Future work:

- ***Synthesize precursors for precursors.***
- ***Convert those to nanomaterials. (Cu, Co)***
- ***Synthesize/convert them into N-inks. (Cu, Co)***

Future work:

- Synthesize and print with Fe and Ni N-inks
- Synthesize mix metal N-ink
- Conduct test on the gravure printed metals
- Print different and complex patterns