**Ni-based films by electrophoretic deposition of Ni(OH)\textsubscript{2} nanoflowers and nanoflakes**

**OBJECTIVE**
Ni(OH)\textsubscript{2} nanoflowers and nanoflowers have been sonochemically synthesized in aqueous medium. Two different surfactants (PVP and PAA) have been used as synthesis aid and dispersant, respectively, in order to stabilize and control the morphology of the particles. The employment of PVP allows the fabrication of flake-like particles that can be shaped directly in the reaction media creating a thin film. Films obtained have been characterized in terms of surface morphology, growth mechanism and crystallography.

**EXPERIMENTAL**

**SYNTHESIS**

\[ 0.1 \text{M Ni(NO}_3\text{)}_2, 3 \text{M H}_2\text{O}, \gamma \text{ Ni(OH)}_2 \text{L}_{\text{P}} \]  
Ultrasonic bath (400 W, 200 W, 65 W/cm\textsuperscript{2})

**NANOFLAKES**

- Polyvinylpyrrolidone (PVP) \( M_\text{w} = 20,000 \)
- Polyacrylate (PAA) \( M_\text{w} = 2000 \)

**One-pot synthesis and shaping**

Dried, redispersed and EPD

- EPD -

**EPD NANOFLOWERS**

"One-pot synthesis" and direct EPD from the reaction media.

**EPD CONDITIONS**

1. Ni(OH)\textsubscript{2} (g/L) 0.1 – 1.0
2. \( d \) (Hz/cm) 0.5 – 4.4
3. \( E \) (V/cm) 0.2 – 3.0
4. \( t \) (min) 40 – 30

**CONCLUSIONS**

It is possible to control the morphology of \( \beta\)-Ni(OH)\textsubscript{2} particles through the employment of surfactants as synthesis additives.

**Nanoflowers:**
- Growth by an Ostwald ripening mechanism
- Random aggregation of particle-like particles during growth
- Mechanism favored by the high energy process of ultrasound

**Nanoflowers**

- Low adhesion capacity of the nanoflower-like particles to the ITO substrate due to the small contact surface between both.
- Electrophoretic deposition of the thinnest fraction of platelet-like particles coming from the synthesis process or the aggregates breakage during the dispersion process.

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