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Soudage de papiers par ultrasons : instrumentation, optimisation du procédé, compréhension des mécanismes d'adhésion

Ultrasonic welding of paper : instrumentation, process optimization, adhesion mechanisms

Context

Joining papers and cardboards

Adhesive bonding :

- Use oil-based adhesives
- Reduce recyclability efficiency



Hot-sealing/welding:

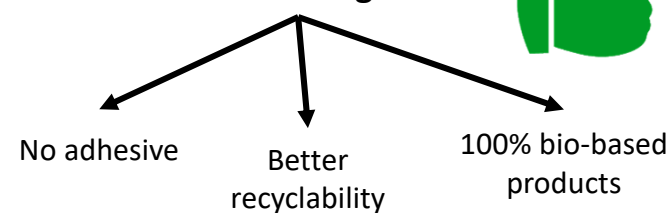
- Require oil-based sealable layers



ANR project : Ultrasonic welding of paper



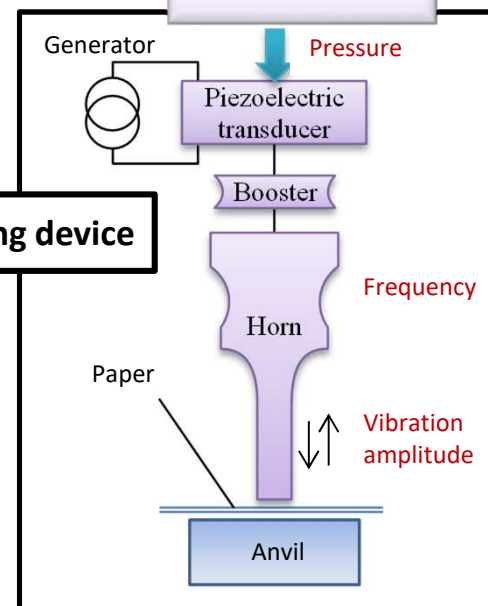
US welding



Method

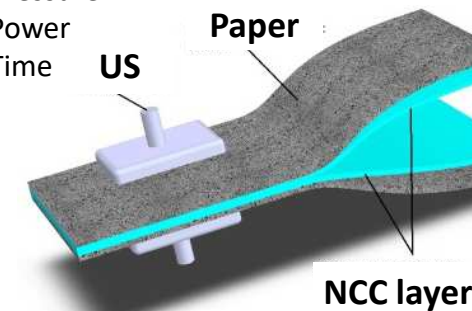


US welding device



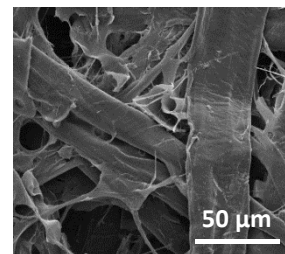
Optimizing process parameters :

- Displacement
- Amplitude
- Frequency
- Pressure
- Power
- Time

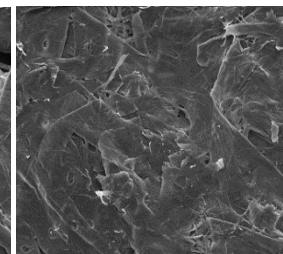


Instrumentation :

- Sensing process parameters
- Sensing paper properties



Before US welding



After US welding

50 μm

Adhesion mechanisms :

- Observation, analysis, identification
- Selective triggering



830 μm