Introduction

The research unit offers teaching and research on paper and paperboard converting technology, materials and products. R&D is focused on extrusion coating, laminating, dispersion coating and their applications. The development challenges of today include high-barrier and thin nanoscale coatings, materials from renewable resources and sustainable packaging materials. The unique pilot lines provide tailored surface treatment and coating possibilities. Well-equipped laboratory has modern analytical methods for characterizing the essential properties of packaging materials. The unit has scientific collaboration with other universities, research institutes as well as paper and paperboard manufacturers and converters and packaging industry. For the industry, there are several opportunities for cooperation varying from academic theses to contract research and small and large-scale projects.

Research and Development

Objectives:

- Improve processing and handling
- Enhance barrier and other material and end-product properties
- Develop sustainable processing methods and materials

Current R&D projects are dealing with:

- High-barrier co-extruded coatings and films
- High-barrier paper and paperboard packages
- Biodegradable and bio-based coatings
- Pre- and post-treatments of plastic films and fiber-based materials and their coatings (flame, corona and atmospheric plasma treatment)
- Thin films and nanoscale coatings based on different techniques (ALD, Atomic Layer Deposition; LFS, Liquid Flame Spray; Atmospheric Plasma Deposition)
- Dispersion coating

R&D Partners:

Paper/paperboard industry, polymer and chemical producers, paper converting and packaging industry, other industry e.g. food industry, national and international research institutes and universities.

Laboratory analyses & instruments

- Temperature and moisture controlled testing room with temperature and humidity chambers
- Barrier measurements:
  - O_{2}\text{TR}: MOCON Ox-Tran 2/21 MH and Ox-Tran 2/21 SS
  - WVTR: MOCON Aquatron 1G and Cup test (ASTM E96/ E96M-10)
  - CO_{2}\text{TR}: MOCON Permatran-C 4/41
  - Grease resistance (ASTM F119-82)
- Dual column material testing machine: Strength properties and adhesion measurements (90° and 180° peel)
- Contact angle and surface energy (KSV CAM200 and Pocket goniometer PG3)
- Heat sealability and hot tack (KOPP SGPE 20 laboratory sealer)
- Coefficient of friction (Qualitest FX7100-V)
- Perkin Elmer Spectrum One FTIR with ATR unit
- Optical microscope with polarisation contrast + microtome
- Extrusion rheometer
- K control sheet coater
- Brookfield viscometer
- Package testing:
  - Hydrogen leak detector H2000
  - PBI Dansensor CheckPoint \text{O}_{2}/\text{CO}_{2}

Further information: http://www.tut.fi/mol