Mission Statement
Currently, elastic yarns are mainly produced by dry spinning. Toxic solvents are often used, for example acetone, dimethylformamide (DMF) or dimethylacetamide (DMAC). Avoiding the use of these solvents is particularly advantageous for textiles which are in contact with human skin, such as clothing or medical textiles. Although the majority of these solvents can be recovered by evaporation, residues remain in the spun and processed yarns, which can be released in long-term use. High surface stickiness also limits further processing, as winding and unwinding are massively disturbed.

Depending on the polymer, melt spinning processes achieve up to 7,000 m/min while the maximum speed of current dry spinning processes is 2,000 m/min. Therefore, the consortium pursues three objectives in the "ElasKosTex" project:

- Development of a melt spinnable thermoplastic elastomer compound (TPE)
- Development of a melt spinning process for elastic multifilaments
- Development of cost-effective elastic tapes for medical and hygiene textiles based on new yarn materials
**Approach**

In order to achieve these goals, the approach of bicomponent melt spinning is pursued. A TPU in the core ensures sufficient elasticity of the filaments, while a shell of TPE reduces the tackiness and thus facilitates further processing. The yarn usability is validated in the application of compression stockings.

**State of the art:**
- Solution spinning at < 2,000 m/min
- Intermediate step: production of wrapped or commingled yarns

**Deficits:**
- Toxic solvents
- Low productivity
- Up to 55 % additional costs due to wrapping or commingling

**Target:**
Development of cost-effective, elastic filaments with improved processability using a bicomponent melt spinning process

**Approach:**
- Development of a thermoplastic elastomer with improved melt spinnability
- Bicomponent melt spinning with thermoplastic polyurethane as the core and a thermoplastic elastomer as the shell component
- Adaptation of the bicomponent filament yarn properties in the melt spinning process
- Validation of the yarn usability in the application of compression stockings

**Economic relevance:**
- Global growth rate of 8.8 % between 2015 and 2022 in the global market for elastic filaments, from US$ 5.82 billion to US$ 10.49 billion
- Global growth rate of 4.9 % between 2018 and 2025 in the global medical textile market, from US$ 16.70 billion to US$ 23.34 billion

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