Metallization from supercritical carbon dioxide ($scCO_2$)

The high dissolving power of supercritical carbon dioxide ($scCO_2$) and its toxicological safety are used industrially in many technical areas. These include, above all, extraction processes such as the industrial decaffeination of coffee and the extraction of hops. Taking advantage of the above-mentioned benefits, a novel process for the water-free dyeing of fibers from $scCO_2$ was developed at DTNW in the1990s. Based on this previous knowledge, the goal of the R&D project was to expand the range of applications of this technology for textile finishes. Specifically, the project aimed to develop the process engineering fundamentals for the metallization of polyester fibers from $scCO_2$ using organometallic compounds in order to impart electrical, antibacterial and catalytic properties to the modified textiles. All the organometallic compounds investigated could be enriched in polyester fibers using $scCO_2$ and the desired effects achieved. From a scientific-technical point of view, the DTNW's existing knowledge in the field of finishing and modification of textile materials from $scCO_2$ has thus been significantly expanded. At the same time, the course was set for technical utilization. For example, the R&D results can be used for antistatic textiles (clean rooms, electrical shielding), for flexible heating elements (sportswear, wellness), textiles with antibacterial properties (wound dressings, outdoor textiles, sailcloth) or, in the long term, for completely new types of textiles with catalytic properties (e.g. chemical industry). In addition, the basic combinability of properties was worked out using the example of dyeing/antibacterial finishing, which further expands the economic potential of this water-free high-pressure technology for the textile sector.

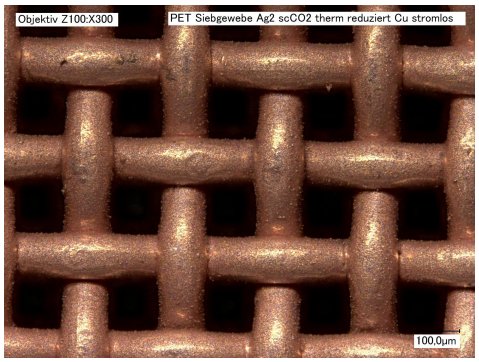

Figure 1: Polyester screen fabric after silver finishing
from scCO2 and subsequent external currentless copper deposition.

Project Information:

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