CIVIL AND ENVIRONMENTAL ENGINEERING

PNRR - Synthetic textiles and environment: from production to recycling

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]
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Context of the research activity	The proper management of synthetic textiles, both in the production and recycling phases, represents one of the most recent challenges for environmental researches. In this direction, the research has the goal to reach the textile circular management and to optimize the textile waste processing. Representative and systematic characterization measurements in laboratory on the textile samples from several production and waste treatment plant will be carried out and the results will be transferred to the plant to improve the process of production and recycling. PNRR M4C2, Investimento 1.3 - Avviso n. 341 del 15/03/2022 - PE0000004 3A-ITALY Made in Italy circolare e sostenibile - E13C22001900001
	Plastic pollution has recently undergone a substantial increase and recently considerable attention has been paid to methods for estimating, preventing and reducing microplastics released into the environment. In this context, the production of synthetic microfibres and related pollutants associated in the textile sector is predominant both at the level of the production process (production methods and management of company waste) and at the level of correct management of garments discarded by the consumer. Researches are currently carried out to associate the tendency to release microfibres into the environment to the different types of synthetic textiles and only in recent years has textile management become an important legislative and management requirement not only for Italy but also for European countries. In addition, although more and more recycled polyester fabrics are on the market, it is known that this type of fabric produces a great amount of microfibers in the various treatments undergone during the process and washing. Therefore the new sustainable and circular products as recycled polyester could be considered a threath for the environment and a source of

Objectives	relavant pollution. In addition, the multiplicity of synthetic fabrics often are not in purity but are made up of different percentages of synthetic fibers and their degree of purity from other foreign materials makes the recycling process difficult for re-use in the same sector . For this reason often a downcycling process is implemented, not in compliance with the circular economy paradigm. Finally the correct management of synthetic fabrics both in the production and recycling phases represents one of the most important and recent challenges for scientific research in support of a technical aspect and the environmental protection. In this direction, a research is proposed which will have the aim of optimizing the production and recycling processes of textiles for the purposes to: -reduce the release of synthetic microfibres -carry out a circular management of both industrial and urban textile waste -improve the textile treatment process for recycling This will be possible by carrying out numerous, representative and systematic measurements of identification and characterization of the textiles present in the various textile collection and treatment plants. These measurements will initially be conducted in the laboratory with the aim of finding the best management and process solution for the treatment plants. The results will be transferred to the plant in order to optimize their process going toward the goal of environmental sustainability.

Skills and competencies for the development of the activity	The candidate should demonstrate: skills in textile or environmental engineering; knolwedge and experience in the use of FTIR techniques for polymer recognition. In the case of foreign candidate, being in possession of the GRE certificate could represent a preferential selection criteria .