Mechanical Behavior of Nano-Micro Composite Core Spun Yarns
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Spinning of core spun yarn has been an old technique for making yarns. Spinning of core into fibrous strand is mostly used either to make yarns that are not spin able otherwise e.g. very fine yarns, or core is inserted in ordinary yarns to have a combined effect of both core and fibres, as it is done in making of core spun Lycra yarns for having high elasticity. Recently a lot of work has been done to make yarns out of nanofibre[1, 2]. The main advantage that these yarns have over other filament yarns is their high surface area as compared to ordinary filament yarns. Nanofibre Yarns of infinite lengths can now be made through electrospinning. These yarns can have desired properties by use of proper chemicals in their manufacturing. But these yarns have some deficiencies which prevent their use directly into textiles for practical purposes. One such problem is their very high elongation and less elastic recovery[3]. Because of this high elongation these yarns cannot be woven into fabrics. As in weaving for example, warp yarns have to be divided into two sheds for weft insertion. This shedding cannot be done with such high elongation.

The work done in this paper is an effort to overcome these inherent deficiencies in nanofibre yarns, and convert them into yarns that can be directly converted into fabrics. For this purpose the idea of making a core spun nano fibre yarn has been used. An electrospun nano fiber yarn was spun as core into 100% cotton yarn and properties of this new yarn were tested as shown in figure 1. Once this yarn is made it can be easily converted into fabric. Also if we only need nanofibrous portion of the yarn it can be spun inside some fibres that can be later dissolved in some chemical solution and fabric made of nanofibres will be achieved.

References

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