

ITC Research Student Seminar 2015-16

Date: 27 June 2016 (Monday)

Time: 2:30 pm – 3:30pm

Venue: Room MN109, The Hong Kong Polytechnic University

Speaker: AHMAD Ishaq (PhD Student)

Topic: Dye sensitized TiO₂ for self-cleaning cotton fabrics

Speaker: Lam, Ngan Yi Kitty (PhD Student)

Topic: Application of protective clothing with chitosan cotton blend yarn development

Speaker: Tang Wing Shan (PhD Student)

Topic: Yarn Colour Measurement and Reproduction by Multispectral Imaging System

Abstracts

Topic: Dye sensitized TiO₂ for self-cleaning cotton fabrics

In all photo catalytically self-cleaning textiles fabrics, UV light source has been used and thus utilize only 3-5% of sunlight which limits their applications under visible light source. More commonly anatase TiO₂ colloid as a photocatalyst has been applied to cotton fabrics using conventional dip pad dry cure process for self cleaning textiles. TiO₂ absorbs in ultra-violet range of sunlight and thus it has limited applications. It was found in studies that when TiO₂ coated cotton is functionalized with some visible light sensitizers, its photo activity is enhanced significantly in the near visible region of the light spectrum. In some reports it has been revealed that when TiO₂ coated cotton fabric is surface functionalized with porphyrin, a natural

compound with close structural resemblance to chlorophyll, its photoactive spectrum has broadened to near visible region. Although the porphyrin is good light sensitizers but still its light absorption is limited to ultraviolet or near visible region. Therefore, it is need of the research to developed durable self-cleaning textile fabrics under visible light irradiation to make fruitful use of sunlight for energy harvesting and for practical applications of the textile cotton fabrics. In this research report phthalocyanine reactive dyes have been used as photo sensitizers. Cotton fabric was coated with TiO₂ nano sols. These TiO₂ coated cotton fabrics were dipped and heated in phthalocyanine dyes solutions. Then photo catalytic activity and self cleaning efficiency of these cotton fabrics were checked by dye degradation and stains removal respectively.

Topic: Application of protective clothing with chitosan cotton blend yarn development

Epidermolysis bullosa (EB) is a rare hereditary skin disease that causes skin fragility and blistering. Since the wounds due to EB do not fully heal and there is currently no available medical technology that can cure this ailment, patients suffer a lifetime from the related physical and psychological pain. It is therefore important that skin-protective apparel with protective functions is specifically developed for EB patients to improve their wear comfort and reduce their chances of further skin injuries through the interaction of clothing as a “second skin” and the human skin.

This study will determine the role of chitosan based yarn in providing comfort to EB patients to scientifically determine the association between textile comfort and medical treatment, and establish the relationship between percentage composition and comfort to facilitate further examination of medical textiles in both theoretical and practical aspects.

Topic: Yarn Colour Measurement and Reproduction by Multispectral Imaging System

Conventionally, measuring and thus reproducing yarn colour is mainly in an indirect way involving the preparation of yarns in card or even fabric forms which consumes time and labor. A direct method based on multispectral imaging system would be one solution. In this research, 100% raw cotton yarn hanks dyed by several reactive colorants being different sample sets were measured by both spectrophotometer and multispectral imaging system for back-prediction and forward-prediction matching comparisons with the

former one traditionally in yarn card form and the latter one innovatively in yarn form itself. Experimental results showed that the multispectral imaging system can perform the close-loop colour reproduction satisfactorily by the yarn form colour measurements with colour difference means all within the industrial tolerance. This new method is capable of shortening the yarn specimen handling time and more importantly to give the more accurate yarn colour measurements without the influence of neighboring colours so as to give the betterment in coloration accuracy.

~All are welcome~