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Study on structures and properties of ultra-hot drawing UHMWPE fibers fabricated via dry spinning method

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High tensile strength Ultra High Molecular Weight Polyethylene (UHMWPE) fibers were prepared via dry spinning method. Raw material was UHMWPE resin with 6 million viscosity-average molecular weight. Changes of morphology, mechanical properties, thermal properties and crystallization process of the fibers in ultra-hot drawing process were studied by SEM, tensile tester, DSC and WAXD. Results show that there was a maximum value of fracture force at draw ratio of 40 and excessive draw ratio would destroy crystal structures in fibers and led to decreasing of fracture force (F) value. A shoulder peak appeared in DSC curves of ultra-drawing samples and its peak value maintained at 154 oC in different samples. In addition, three peaks can be observed in all WAXD pattern of drawing samples. Mechanism of microstructural changes during hot drawing process was elucidated.

Biography

Yongyi Mai entered East China East China University of Science and Technology (ECUST) in 1978 and gained his bachelor degree in 1982 in major of organic chemical engineering. After his graduation, he joined Shanghai Research Institute of Chemical Industry (SRICI) and worked on polyethylene oxide (PEO) and ultra-high molecule weight ethylene (UHMWPE), including catalytic technology and production development.

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