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| Title**عنوان البحث** | Influence of sulfuric acid solution on the durability of high-performance modified polyphenylene sulfide and polytetrafluoroethylene sewing thread for high-temperature filtration |
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| Abstract**خلاصة** | * High-temperature filtration is a promising development in particle collection technology. In this field, the filtration efficiency of the filter bag is affected by the surface hairiness of the sewing thread, which has the function of sealing pinholes. A high-performance modified polyphenylene sulfide (MPPS) and polytetrafluoroethylene (PTFE) sewing thread had been prepared. However, the effect of the addition of MPPS fibers on acid resistance of MPPS/PTFE sewing thread was a crucial issue that was still unknown. In this study, surface morphology, tensile properties, and the corrosion mechanism of MPPS/PTFE sewing thread exposed to sulfuric acid (H2SO4) solution was investigated under different temperatures, concentrations, and times. It was noticed that the auxiliary agent on the surface of MPPS/PTFE sewing thread was partly removed. Besides, the surface of MPPS fibers was slightly damaged by H2SO4 solution. Moreover, the tensile properties showed that the maximum loss of fracture strength and the maximum deviation of elongation at break of MPPS/PTFE sewing thread were around 9.1% and 4.6%, respectively. Hence, it could be concluded that the addition of MPPS fibers had little effect on MPPS/PTFE sewing thread. Furthermore, when the concentration of H2SO4 solution did not exceed 10 mol/L, MPPS/PTFE sewing thread showed a good acid resistance. Fourier transform infrared spectroscopy analysis did not show a change in the structure of the benzene ring skeleton of the macromolecular chain in MPPS/PTFE sewing thread after treatment with H2SO4 solution. In contrast, the carbon–sulfur bonds attached to the benzene ring in MPPS/PTFE sewing thread had rotated or even partially broken. Thermogravimetric analysis and differential scanning calorimetry measurements revealed that the thermal stability of MPPS/PTFE sewing thread was slightly decreased.
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