

## 2 - 39 Study on Modification of Polyacrylonitrile Fiber

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With the development of energy crisis and greenhouse effect, the application of nuclear energy becomes the ideal energy solutions. Chelate fiber with amidoxime group has high specific surface area, whose adsorption of uranium content is higher than other similar resins. Therefore, the chelate fiber was recognized as the main development of uranium sorbent. The modification of polyacrylonitrile fiber which has the chelating ability to uranyl ion is prepared by adding the polyacrylonitrile fiber into aqueous hydroxylamine, then nitrile of polyacrylonitrile fiber converted into amidoxime group at suitable temperature(Fig. 1). Effect of pH on polyacrylonitrile fibre's transformation efficiency is discussed in this work(Fig. 2).

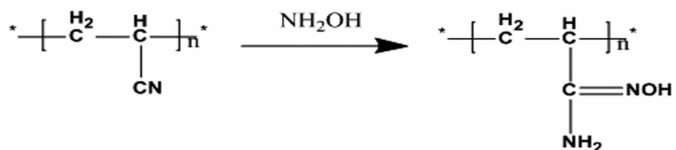


Fig. 1 Scheme for synthesis of the polyacrylonitrile chelating fiber.

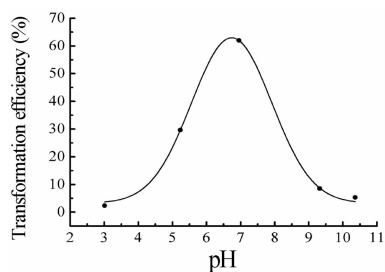


Fig. 2 The effect of pH on the polyacrylonitrile chelating fiber preparation.

1 g PAN was added with 250 mL  $\text{NH}_2\text{OH} \cdot \text{HCl}$  solution (14.0 g/L). The pH was ranging from 3 to 11 with  $\text{Na}_2\text{CO}_3$  and  $\text{HCl}$ . Reacting at 70 °C for 24 h, the modified PAN was washed, dried and calculated. Fig. 2 shows the effect of pH on the polyacrylonitrile chelating fiber preparation. pH range from 6~8 was the optimum condition. Because  $\text{NH}_2\text{OH}$  has bad stability. For the case of low pH value, there was some  $\text{NH}_2\text{OH} \cdot \text{HCl}$  remained. Which was bad to full extent of reaction and result in a low transformation efficiency. For the case of high pH value, it existed in another form of  $\text{NH}_2\text{OH}$  molecules in the solution. In that case, Its stability is poor and easy decomposition, its volatility increases and chelate fiber translation efficiency is low. So the chelate fiber translation efficiency is high at the pH range of 6~8.

### References

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- [2] H.J. Schenk, L. Astheimer, E.G. Witte, et al., Sep. Sci. Technol., 17(1982)1293.