

CHAPTER V

CONCLUSIONS AND RECOMMENDATION

5.1 Conclusions

In this work, preparation of titania/polymer composite fibers and the reaction to convert the composite into titanium nitride were investigated. The conclusions of the present research are the following:

1. Titanium nitride fibers can be synthesized from electrospun titania/PVP composite fibers via the carbothermal reduction and nitridation.
2. Free carbon content in the composite is one of the important factors affecting the conversion of pyrolyzed titania/PVP composite fibers into titanium nitride.
3. The different type of carbon source gives different product properties. Carbon black gives higher conversion than poly vinylpyrrolidone, while the products from poly vinylpyrrolidone retain in fiber form more effectively than carbon black.
4. When nitrogen flow rate is doubled, the conversion of the reaction is not significantly different from that achieved by low flow rate, but crystallinity of particles decrease.

5.2 Recommendations for Future Work

For synthesis of titanium nitride from electrospun titania/carbon composite nanofibers via the carbothermal reduction and nitridation process, effects of various factors, such as type of carbon source and carbon content as well as conditions for the carbothermal reduction and nitridation, on yield of titanium nitride were investigated in this work. Some recommendations for future studied are proposed as follows:

1. Other metal alkoxide precursors should be further investigated.
2. The temperature in pyrolysis process should be varied and investigated.
3. For the reaction to convert the composite into titanium nitride, other type of gas, such as ammonia, and higher gas flow rate should be investigated.
4. The mechanism of carbothermal reduction and nitridation reaction should be further studied in detail.