

## THE EFFECT OF THE CONCENTRATION OF PLASTIC WASTE ON THE FORMATION OF REACTION PRODUCTS OF THE Ti-PET SYSTEM \*

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The results of studies of the synthesis, phase composition and structure of products obtained as a result of highly exothermic reactions between the components of a mixture of Ti and C<sub>10</sub>H<sub>8</sub>O<sub>4</sub> are presented. The dependence of the synthesis temperature, phase composition and structure of the products on the concentration of the plastic component in the initial Ti-PET system was found. When the PET content changes from 20 wt.% up to 33.3 % by weight.% the synthesis temperature in the Ti–C<sub>10</sub>H<sub>8</sub>O<sub>4</sub> mixture does not change and ranges from 2900 to 2930°C. With an increase in the plastic component from 33.3 wt.% to 45 wt.%, the temperature decreases from 2917 to 2018 °C, which is consistent with the results obtained in the references. [1–3]. At the same time, when the concentration of the plastic (PET) component is 20-25 wt. % synthesis products contain phases of titanium carbide and oxycarbide. With an increase in the concentration of the plastic component to 33 wt. % and above, a monophasic product containing only titanium carbide is formed. Based on the results obtained, the best conditions were determined for conducting a highly exothermic synthesis reaction in the Ti-PET system to obtain a TiC<sub>0.95-1</sub> powder with an average particle size of no more than 4.5 microns. The composition of gaseous products obtained in the synthesis process is determined and the adiabatic temperature of their combustion in air is calculated. These data demonstrated the possibility of using gas as a fuel for energy generation devices with a higher potential for fuel interchangeability, such as radiation burners or rotary engines. The results of these studies will help lay the foundation for a new technology for recycling plastic waste to create materials containing carbides of various compositions. In addition, these results will ensure the stable development of chemical engineering and a new direction in this field, namely synthesis by a highly exothermic reaction using waste and secondary materials 2.8 cm

### REFERENCES

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