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## INFLUENCE OF PLATINUM CLUSTER SIZE ON REACTIVITY IN THE PROCESS OF OBTAINING ETHANE FROM METHANE

**Kobilov Nodirbek Sobirovich\***; **Rakhmatov Xudoyor Boboniyozovich\***;  
**Shukurov Abror Sharipovich\*\***; **Sulaymonov Ikromjon\*\***;  
**Khushnazarov Shohboz\*\***; **Boynazarov Ruziboy Abdulaziz ogli\*\***

\* PhD, Associate Professor,  
 Karshi Engineering Economics Institute,  
 UZBEKISTAN

\*\*Master Students,  
 Karshi Engineering Economics Institute,  
 UZBEKISTAN

### ABSTRACT

*The paper shows the influence of platinum cluster size on reactivity in the process of obtaining ethane from methane. The enthalpy of activation and geometric parameters of intermediates and transition state for the stage of methane activation on an  $Al_6O_9$  substrate, As well as geometric parameters of clusters used in calculations of the mechanism of ethane formation from methane have been presented. The alumina was chosen as the substrate material since experimental data indicate that it stabilizes platinum nano clusters. Our calculations confirm this. Upon the adsorption of  $^3Pt_4$  and  $3Pt_6$  clusters on the  $Al_6O_9$  substrate, the energy of the system decreases by 242.5 and 421.7 kJ/mol, respectively, which is higher than the energies with which we will operate in the future, this is an indicator that the clusters formed on the  $Pt_4Al_6O_9$  and  $Pt_6Al_6O_9$  substrate are stable.*

**KEYWORDS:** Methane, Ethane, Platinum, Alumina, Cluster, Size, Influence, Substrate.

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