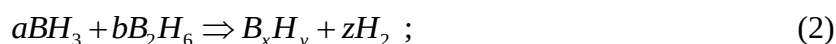


ABOUT THE DEPOSITION OF BORON FROM THE GAS PHASE

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Thermal decomposition of hydride boron is a difficult multistage process and in simplified can be presented by the following equations:



Proceeding from the suggested mechanism, the process rate can be limited by either dissociation of B_2H_6 or decomposition of intermediate reaction products on the substrate deposition.

Dissociation of rate B_2H_6 (V_{dis}) in depending on process temperature and initial component concentration is determined by equation:

$$V_{dis} = A \cdot \exp\left(-\frac{E \cdot a}{R \cdot T}\right) \cdot [\tilde{N}_{B_2H_6}] , \quad (4)$$

where A , E – before-exponent and energy of activation for dissociation process; $[\tilde{N}_{B_2H_6}]$ – a concentration of B_2H_6 .

In the reactor of decomposition of flow-type a reaction is implemeted:



For a reaction (2) in absence of heterogeneous processes the model of running reactor of cylindrical type will be characterized by the system of equations:

$$\frac{d}{dz}(U \cdot C_{B_2H_6}) + \frac{2R_{int} \cdot \xi \cdot \beta \cdot k^r \cdot C_{B_2H_6}}{(R_{ext}^2 - R_{int}^2) \cdot (\xi \cdot k^r + \beta)} = 0 ; \quad (6)$$

$$\frac{d}{dz}(U \cdot C_{H_2}) + \frac{2R_{int} \cdot \xi \cdot \beta \cdot k^r \cdot C_{H_2}}{(R_{ext}^2 - R_{int}^2) \cdot (\xi \cdot k^r + \beta)} = 0 , \quad (7)$$

where U – rate of gas stream along the axis of reactor; z – a co-ordinate, directed along the axis of reactor; R_{ext} , R_{int} – an outward and internal radius of reactor; ξ , β , k^r – constants, determined by the experienced way.

A model, presented by the system of equations (6)-(7), allows to calculate kinetic descriptions of deposition process of the boron on the heated surfaces.

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