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Investigation of Mesoporous Silicon Carbonization Process

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Abstract : In this paper, an experimental and theoretical study of the processes of mesoporous silicon carbonization during the formation of buffer layers for the subsequent epitaxy of 3C-SiC films and related wide-band-gap semiconductors is performed. Experimental samples were obtained by the method of chemical vapor deposition and investigated by scanning electron microscopy. Analytic expressions were obtained for the effective diffusion factor and carbon atoms diffusion length in a porous system. The proposed model takes into account the processes of Knudsen diffusion, coagulation and overgrowing of pores during the formation of a silicon carbide layer.

Keywords : silicon carbide, porous silicon, carbonization, electrochemical etching, diffusion
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