SiC - Silicon Carbide

Electrical properties

Basic Parameter

		Remarks	Referens	
Breakdown field	**3C-SiC**	~= 10^6 V/cm	300 K	*Goldberg et al.(2001)*
	4H-SiC	(3÷5) x 10^6 V/cm	300 K	
	6H-SiC	(3÷5) x 10^6 V/cm	300 K	
Mobility electrons	**3C-SiC**	≤800 $cm^2 V^{-1} s^{-1}$	300 K	
	4H-SiC	≤900 $cm^2 V^{-1} s^{-1}$	300 K	
	6H-SiC	≤400 $cm^2 V^{-1} s^{-1}$	300 K	
Mobility holes	**3C-SiC**	≤320 $cm^2 V^{-1} s^{-1}$	300 K	
	4H-SiC	≤120 $cm^2 V^{-1} s^{-1}$	300 K	
	6H-SiC	≤ 90 $cm^2 V^{-1} s^{-1}$	300 K	
Diffusion coefficient electrons	**3C-SiC**	≤20 cm^2/s	300 K	
	4H-SiC	≤22 cm^2/s	300 K	
	6H-SiC	≤ 90 cm^2/s	300 K	
Diffusion coefficient holes	**3C-SiC**	≤ 8 cm^2/s	300 K	
	4H-SiC	≤ 3 cm^2/s	300 K	
	6H-SiC	≤ 2 cm^2/s	300 K	
Electron thermal velocity	**3C-SiC**	2.0 x 10^5 m/s	300 K	
	4H-SiC	1.9 x 10^5 m/s	300 K	
	6H-SiC	1.5 x 10^5 m/s	300 K	
Hole thermal velocity	**3C-SiC**	1.5 x 10^5 m/s	300 K	
	4H-SiC	1.2 x 10^5 m/s	300 K	
	6H-SiC	1.2 x 10^5 m/s	300 K	

Mobility electrons μ_n	**3C-SiC**	380 $cm^2 V^{-1} s^{-1}$	300 K	*Nishino et al. (1983)*
	3C-SiC	900 $cm^2 V^{-1} s^{-1}$	300 K ; crystalline.	*Nelson et al. (1966)*
Mobility holes μ_p	**3C-SiC**	15...21 $cm^2 V^{-1} s^{-1}$	300 K	*Nishino et al. (1983)*

For conductivity, carrier concentration and hall mobility in epitaxial layers on Si, see *Temperature dependence*

Mobilities in other polytypes are of the same order of magnitude, see *Electron and hole mobility vs. temperature*

The thermal conductivity of 6H-SiC see also *Electron mobility vs. temperature*