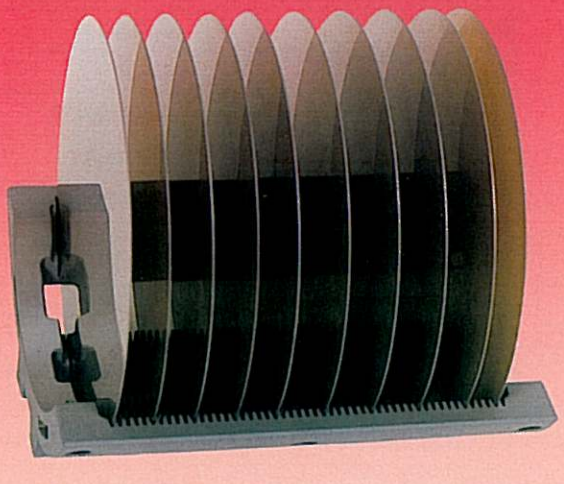
Ultra High-purity SiC Wafer

Mitsui's SiC wafer, excellent in ultra high-purity, high corrosion resistance, and heat resistance, can be used as a recyclable wafer. It is especially useful as a "dummy wafer" for LP-CVD and high temperature diffusion processes.



Features

- Ultra high-purity, non-porous SiC wafer produced by CVD method with impurities of ppb level.
- No concern of process contamination because of a markedly low diffusion coefficient of alkaline metal and heavy metal in high temperature.
- High corrosion resistance to harsh chemicals such as $HF+HNO_3$, allows for only deposited films to be removed easily and selectively by wet etching. So repeated usage is possible and economically advantageous.
- Deposited films do not tend to peel off due to the similar thermal expansion coefficients of SiC, SiN, Poly, etc.This results in a minimum of particles in the processes.
- There is very little thermal deformation at high temperature processes.

Standard Specification

	12"	8"	6"	5"
Diameter (mm)	300±0.5	200±0.5	150±0.5	125±0.5
Thickness (μm)	700±50	650±50	550±50	500±50
Surface roughness	Both sides rough finish ①Ra≒0.1μm(0.04～0.3 μm) ②Ra≒0.9 μm (0.4～2.0 μm)			
Warp	≦1.0mm	≦0.5mm	≦0.3mm	
Orientation flat, Notch	Available			
Edge preparation	More than R 0.1mm chamfering			
Others	With Serial No.			

For special specification, please contact to MITSUI ENGINEERING & SHIPBUILDING CO., LTD.

Application

- Dummy wafer for LP-CVD process
- Dummy wafer for diffusion process
- Dummy wafer for various device processes
- Various device substrates
- Various heat resistant, corrosion resistant jigs and members

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MITSUI ZOSEN (U.S.A.) INC.
C/O PACECO CORP.

Manufacturer

ADMAP **ADMAP INC.**
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SiC Wafer Characteristics

Main Data

Structure	β-SiC(3C), poly-crystals
Density	3.21g/cm^3
Young's modulus	490GPa
Thermal expansion coefficient	4.5×10^{-6}/℃
Thermal conductivity	280w/m.k
Resistivity	10,000Ω·cm

Impurity Content

(unit : ppb)

Na	Co	K	Cu	Zn	Mn	Fe	Cr
<2	1.3	<60	<50	9	<9	35	26

Corrosion Resistance

Ambient	Temperature	Time (h)	Weight change
6N HCl	B.P. (110℃)	1470	None
9N HNO_3	B.P. (116℃)	1470	None
19N H_2SO_4	B.P. (128℃)	1470	None
17%HF+83%HNO_3	R.T.	532	None
Aqua regia	80℃	186	None
Air	1500℃	146	None
HCl gas	1200℃	25	None
49%HF	R.T.	168	None
85%H_3PO_4	160℃	168	None

Diffusion Coefficient of Metals in SiC/Si Wafer

(cm^2/sec at 1300℃)

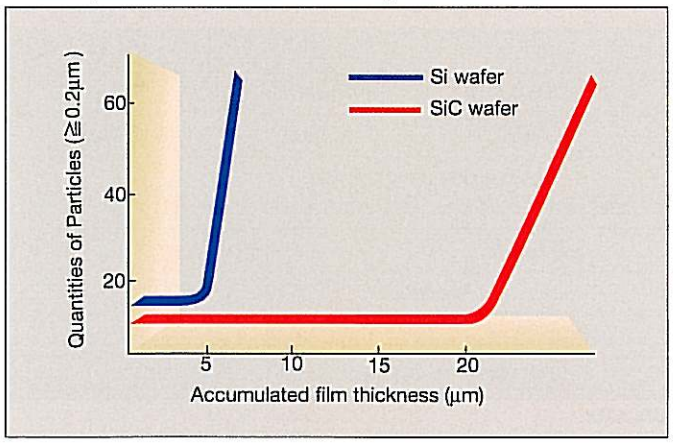
Metals	In SiC wafer	In Si wafer
Fe	6.5×10^{-14}	10^{-5}
Co	1.3×10^{-13}	3×10^{-5}
Cr	6.3×10^{-14}	5×10^{-6}
Au	8.6×10^{-14}	3×10^{-5}

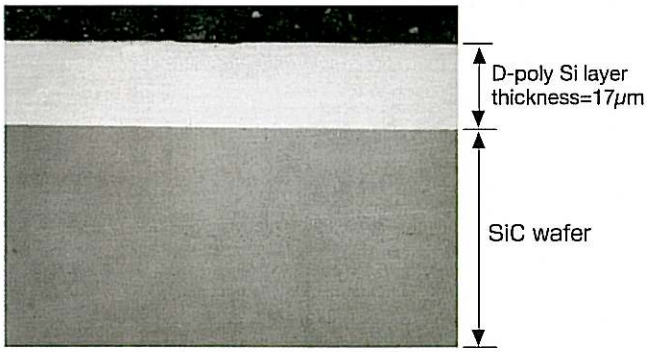
Etching Cycle Test with Oxidation

- **Test** : 50 cycles of following steps
  - step1 : In the oxygen 1200℃, 1Hr holding
  - step2 : Room Temp., HNO_3 : HF=5 : 1, 10min holding
  - step3 : Ultra-sonic cleaning in pure water
  - step4 : Drying
- **Result** : Average thickness loss=0.053μm/cycle

Example of Application (Relation between deposited film thickness and particle number)

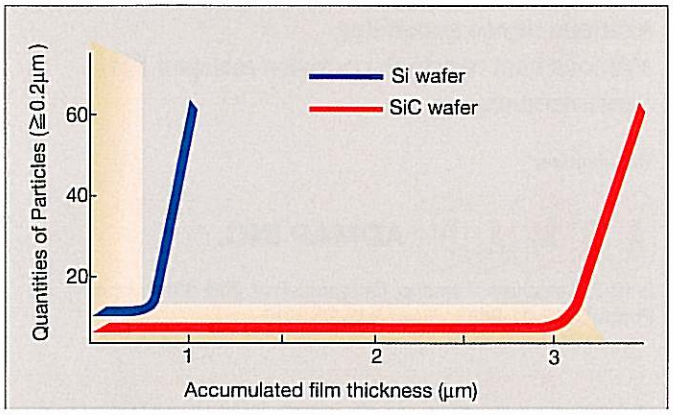
Ex.1 Doped silicon film in LP-CVD process

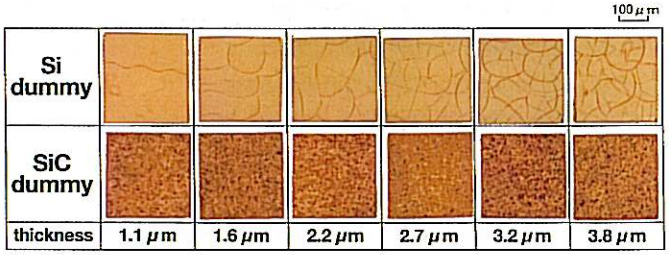




Cross section (SEM) : D-poly Si on SiC wafer

Ex.2 SiN film in LP-CVD process





Surface Morphology of Si and SiC dummy deposited SiN