SiC Ceramics

TROJAN
Discover the Truth of Material

Purpose:

Prepare a polished SiC ceramic sample. Silicon carbide ceramics exhibit low thermal expansion coefficient, high specific strength, high thermal conductivity, high hardness, excellent wear resistance, low friction coefficient, corrosion resis-tance, and most importantly, maintain superior performance at temperatures up to 1650°C. These properties make SiC ceramics one of the most widely used structural ceramics. The sample undergoes cutting (TableCut200), mounting (TJ2568 cold-mounting resin), grinding/polishing (Alpha610), and microstructure observation (MN80 metallographic microscope).

Recommended parameters for different specimen size				
Sample size/ diameter (mm)	25	30	40	50
Individual force loading mode, individual sample pressure force (N)	-5	0	+(5~10)	+(5~10)

*Standard pressure: ϕ30mm (adjust according to sample size).

Recommended Equipment and Consumables(select grinding/ polishing consumables based on sample conditions)



TableCUT-200 manual/automated precision cutting machine

Cutting

Equipment	TableCUT-200 manual/automated precision cutting machine	
Cutting disc	DR resin bond diamond cutting disc	Order No：01.04.656
Cutting coolant	TJ 1410 metallographic cutting coolant	Order No：01.07.857
Fixture	Horizontal push fixture	
Cutting method	Horizontal cutting (Y-axis)	
Cutting Parameters	Feed rate	0.2mm/s
	Cutting mode	pulse mode
	Cutting disc rotation speed	2500rpm

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ThetaMount pressure cold mounting machine

Cold Mounting

Equipment	ThetaMount pressure cold mounting machine	
Cold mounting resin	TJ 2568 epoxy resin	A: Order No: 02.04.855
		B: Order No: 02.04.856
Mix ratio	A: B=4.5:1	
Curing time	45–90min	

Basic Guide

- **Cutting** 1.Choose DR resin bond diamond cutting blades, and refer to the Trojan's Cutting Guide for specific model selection.
  2.Due to the hardness and brittleness of ceramics, pulse mode is selected for cutting, and it is recommended that the maximum cutting speed be ⩽ 0.2mm/s.
- **Mounting** Use high hardness cold/hot inlay resin for mounting.
- **Grinding** 1.Use resin diamond grinding discs starting from P400 until the sample surface is plane and cutting–induced damage is fully removed.
  2.Continue with P1500 and P4000 resin diamond discs.
  3.Sharpen resin bond diamond discs with a dressing stone before use.
- **Polishing** 1.Clean the polishing cloth, sample holder, and hands before starting. Repeat cleaning after each polishing step.
  2.Do not mix discs with different abrasive sizes.
  3.Use alcohol and a blower to clean and dry the sample surface.
  Note: Do not clean surfaces polished with silica polishing fluid using alcohol, as it may cause residue adhesion.
  4.After each step, check under a metallographic microscope to ensure scratch size matches the abrasive grit and that scratches are randomly oriented.
  5.Rinse polishing cloths thoroughly with running water and a soft brush, then air–dry.
  6.If surface relief is severe, re–grind with the final grit and repeat polishing, while reducing the time for silica + ZN polishing.

Preparation Procedure——SiC Ceramics

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1	P400 DiaRe resin bond diamond grinding disc	Water	30N	50/300rpm	Plane
2	P1500 DiaRe resin bond diamond grinding disc	Water	30N	50/300rpm	5min
3	P3000 DiaRe resin bond diamond grinding disc	Water	30N	50/300rpm	5min
4	SC–JP	3μm PD–WT polycrystalline diamond polishing suspension	25N	50/150rpm	5min
5	ZN–ZP	50nm A439 Silica Polishing Suspension	20N	50/150rpm	2min (rinse sample and cloth with water for the last 20–30 seconds)

