Pure Molybdenum

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Purpose:

Pure Molybdenum Metallographic Sample Preparation Method.Molybdenum and its alloys are known for their high melting point, low thermal expansion coefficient, high strength and hardness at elevated temperatures, and excellent resistance to acids and alkalis. Referred to as the "energy metal," they are widely used in steel, aerospace, nuclear power, petroleum, solar, and wind energy industries.

Pressure and Sample Size Recommendations				
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 materials based on sample conditions):



Beta−300Pro Automatic Cutting Machine

Cutting

Equipment	Beta−300Pro Automatic Cutting Machine	
Cut−off wheel	A30 alumina abrasive cut−off wheel	Order No：01.01.360
Cutting Coolant	TJ1410 Cutting Coolant	Order No：01.07.857
Fixture	Fast and quick clamping	
Cutting Method	Veritcal clamp （Z axis)	
Cutting Parameters	Feed speed	0.25mm/s
	Pulse setting	Disabled
	Cutting disc speed	2000rpm

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FlexPRESS Automated Modular Hot Mounting Machine

Hot Mounting

Equipment	FlexPRESS Automated Modular Hot Mounting Machine
Mounting Resin	PT 2231 Hot Mounting Resin Order No：02.01.310
Heating Power	100%
Holding time	5min
Temperature	170℃
Pressure	150bar
Cooling Conditions	Cool to 40°C
Cooling rate	High
Top heating	Enabled

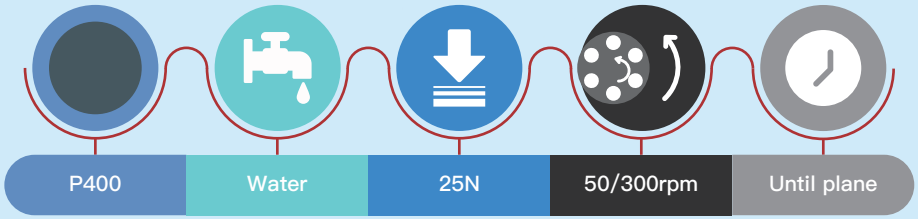
Basic Guide

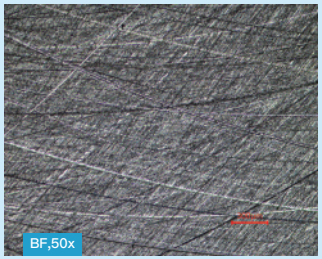
- **Cutting**
  1.Choose A30 alumina oxide cutting disc cutting for pure molybdenum, and refer to the Trojan's cutting guide for specific model selection.
  2.Choose the constant speed cutting mode for cutting the sample, and the maximum cutting speed is recommended to be ⩽ 0.25mm/s.
- **Mounting**
  Hot mounting or cold mounting resin can be used, and hot mounting is preferred.
- **Grinding**
  1.Use SiC abrasive paper to grind from P400 until the sample is flat and the damaged cutting layer is completely removed.
  2.Use POS disc with 9um PD–WT polycrystalline diamond polishing solution for fine grinding.
  3.After each grinding step, it is necessary to clean the sample, sample holder, and the hands.
- **Polishing**
  1.Before starting polishing, it is necessary to clean the polishing cloth, fixed sample holder, and hands. After each step of polishing, the cleaning steps need to be repeated.
  2.Polishing clothes with different particle sizes using different polishing solutions cannot be mixed.
  3.Rinse and dry the surface of the sample with alcohol and use a hair dryer to remove any residual water stains.
  4.After each polishing step, observe on a metallographic microscope whether the thickness of the polishing scratches corresponds to the polishing particle size and whether the direction is random.
  5.After use, the polishing cloth needs to be cleaned with running water and a soft bristled brush, and then drained and stored.
  6.Pure molybdenum polishing cloth is only used for polishing pure molybdenum samples and should not be mixed with polishing other material samples.

Preparation Procedure——Pure Molybdenum

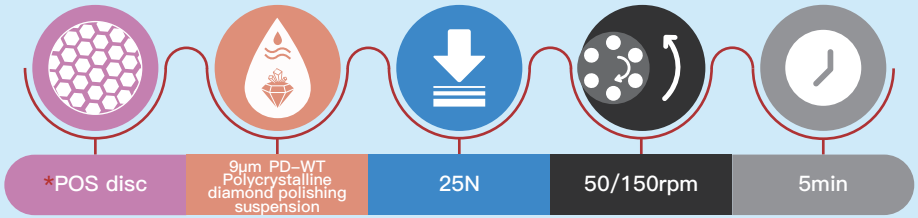
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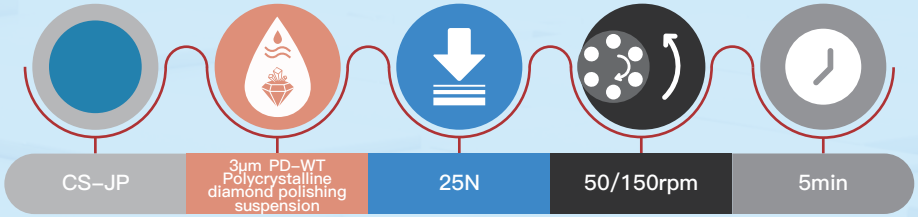
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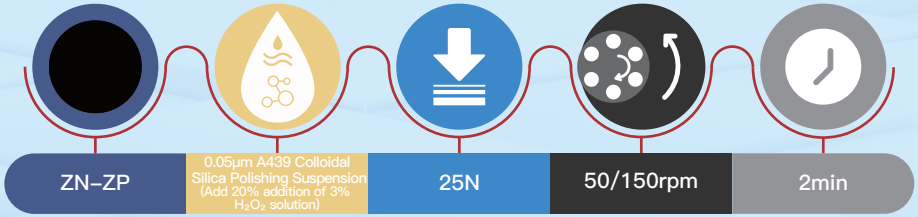
*POS disks can also use P800 and P1500 SiC abrasive paper for replacement.

3





4





Pure Molybdenum - Polishing Defect Sample

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Photos of qualified polished samples



Photo of ZN polishing cloth after polishing –50X

- Slight relief, clean surface without scratches.

Photos of unqualified polished samples

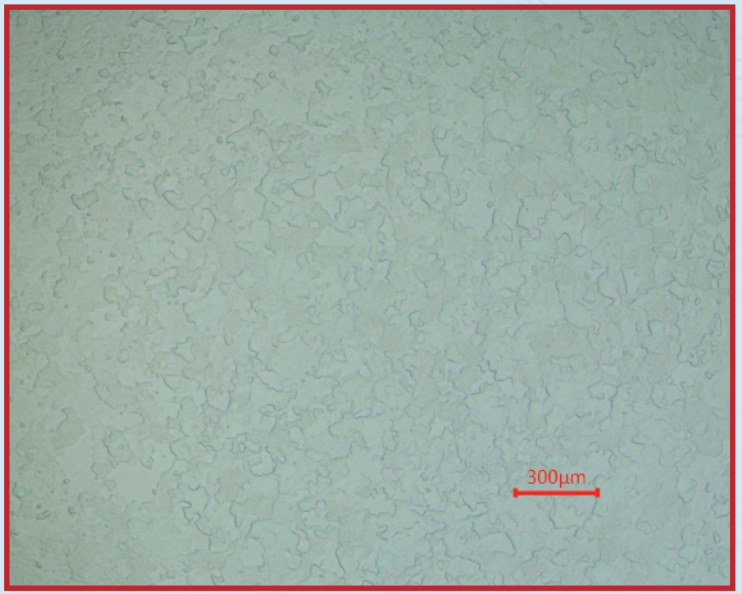


Photo of ZN polishing cloth after polishing –50X

- ZN polishing cloth polishing time is too long;
- Solution: Repeat the CS and ZN polishing steps to shorten the polishing time of the ZN polishing cloth.