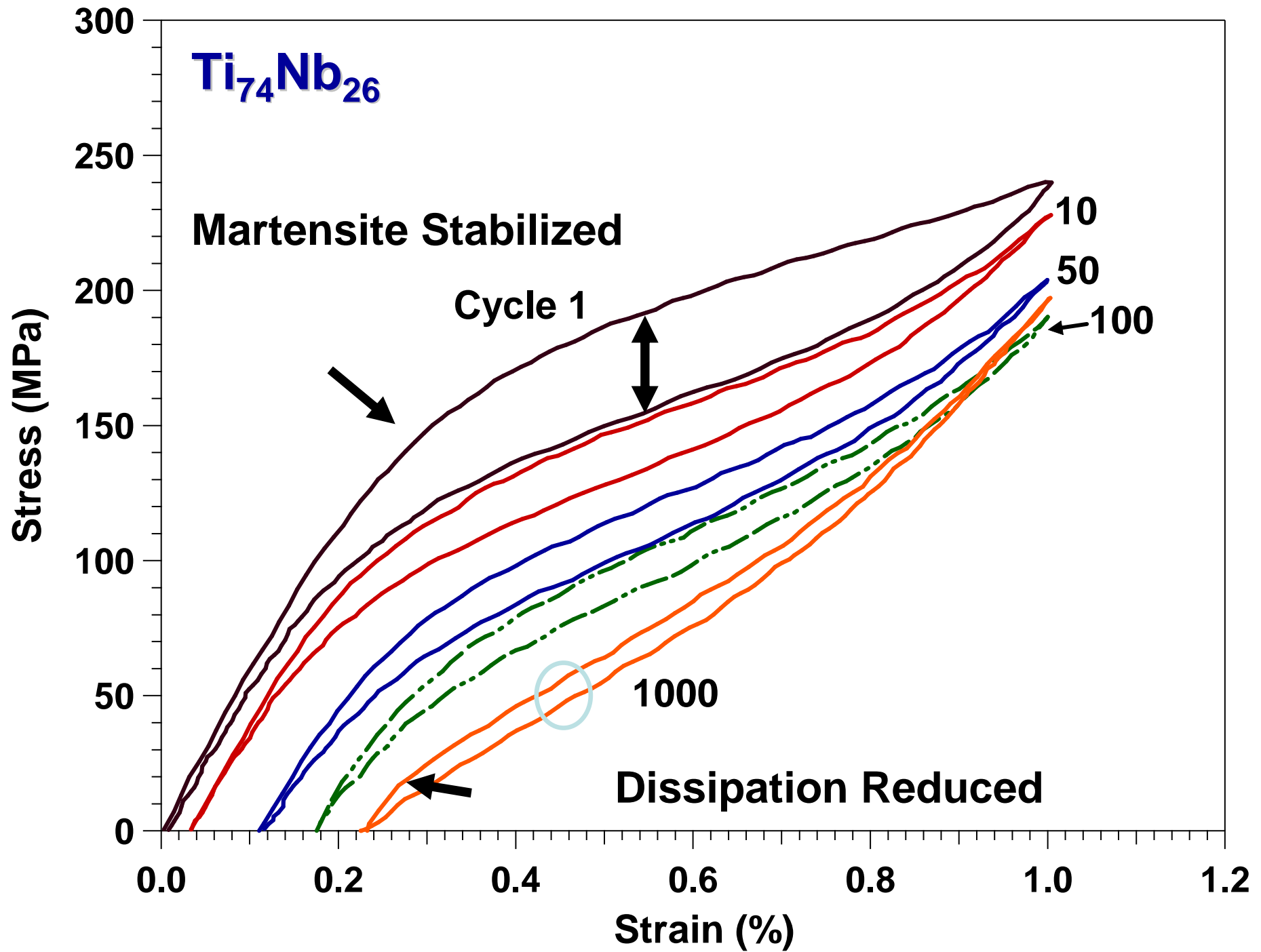


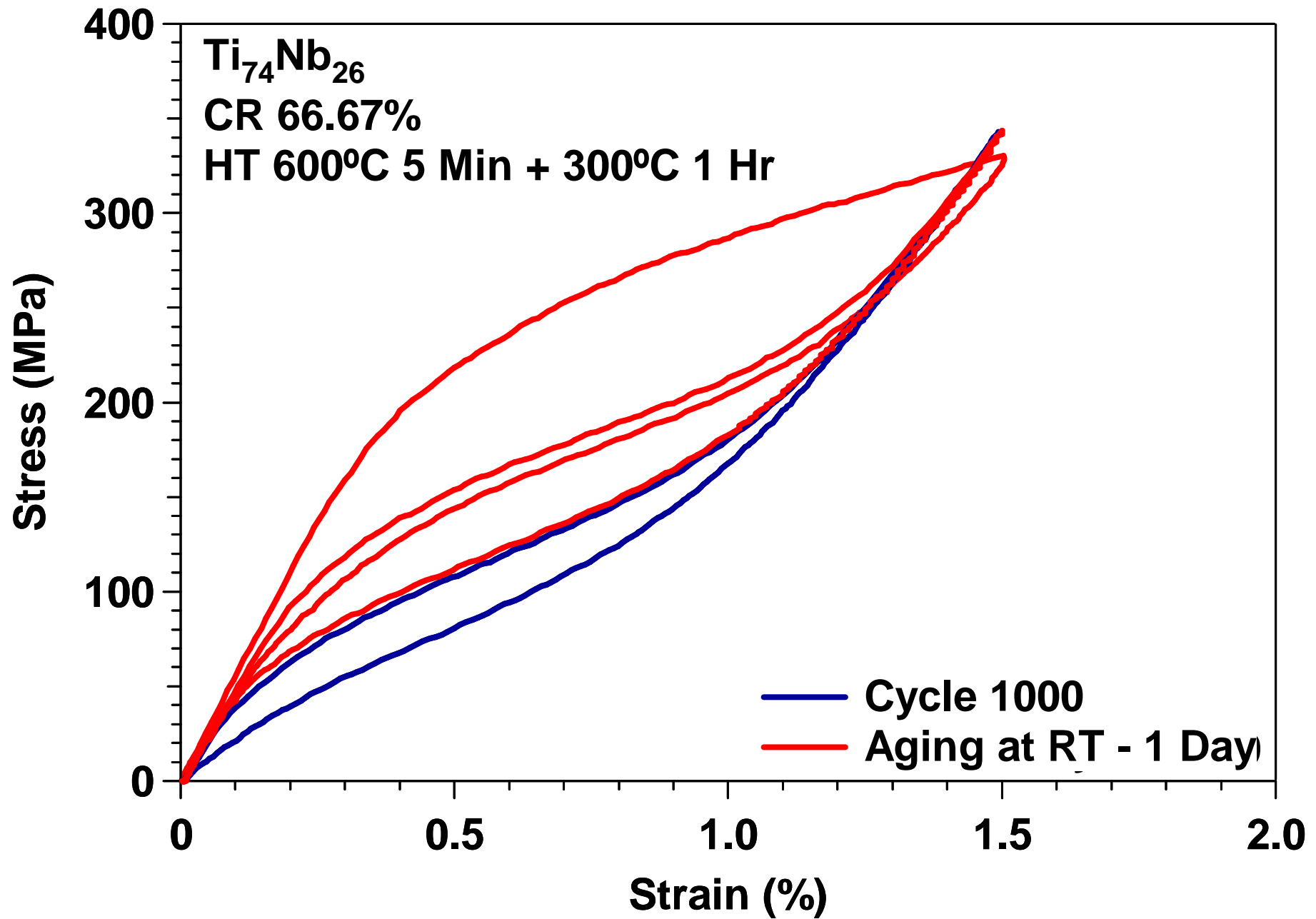
Transformation Memory and Room Temperature Aging Effects in Titanium-based SMAs

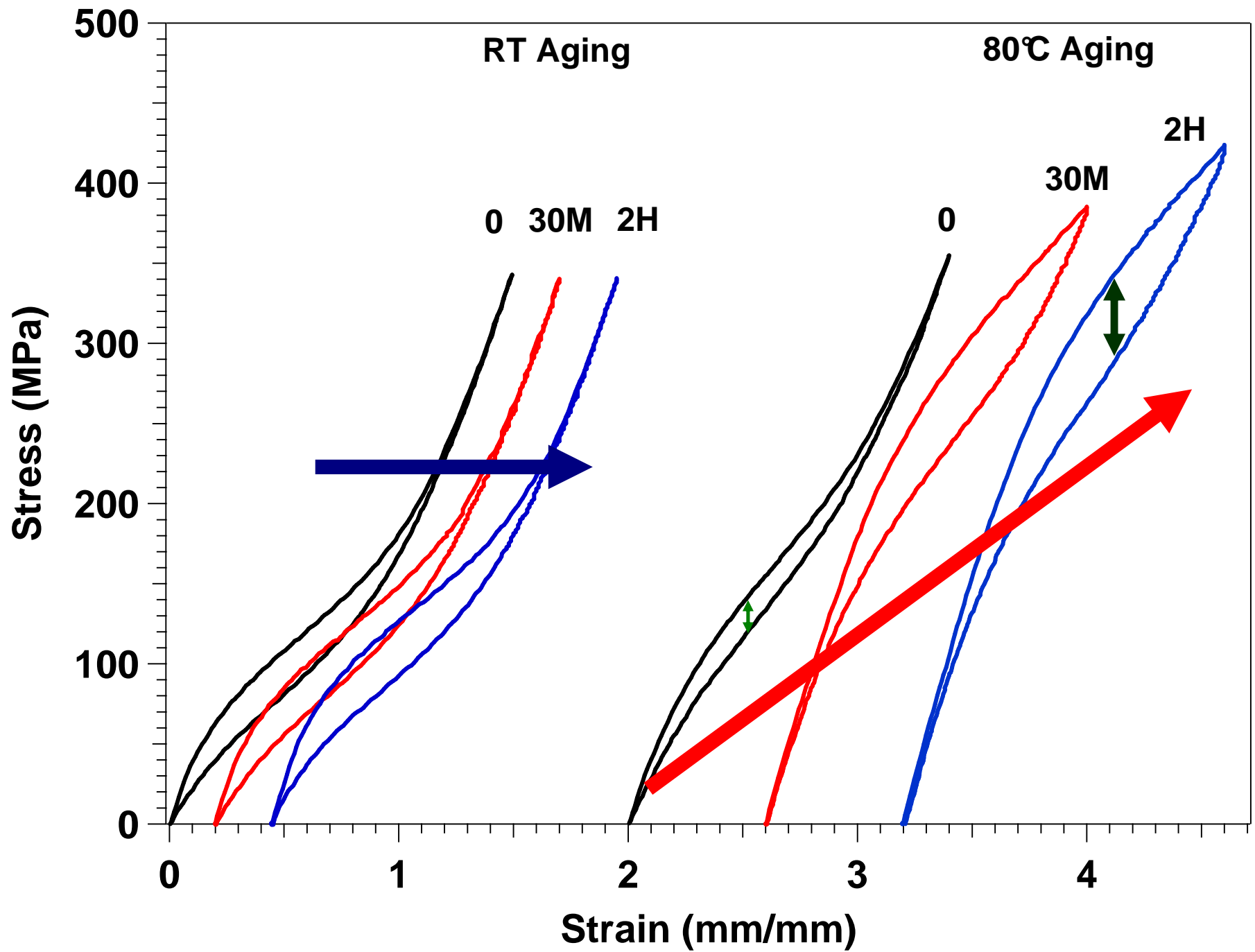
Ji Ma

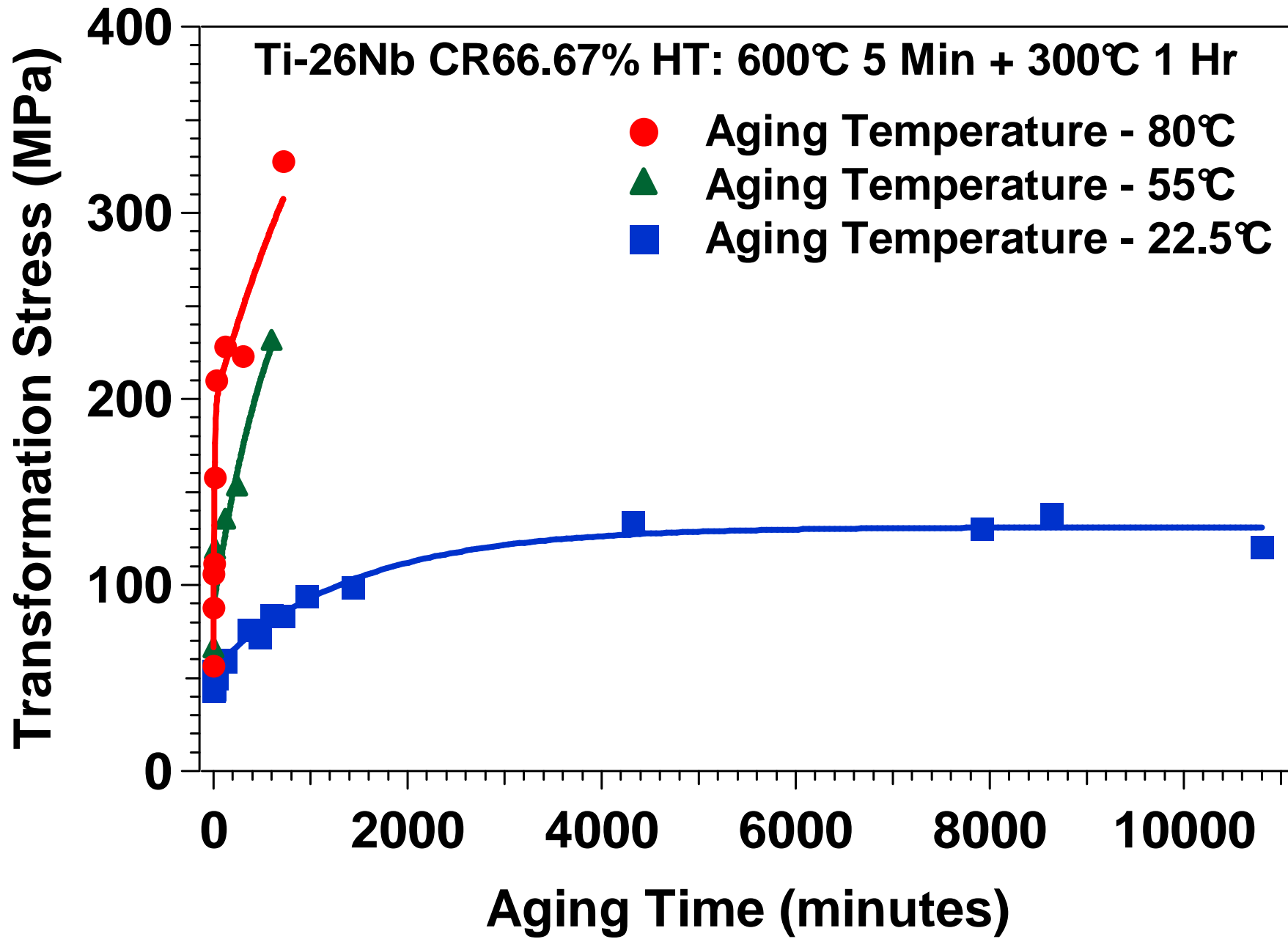
Ibrahim Karaman

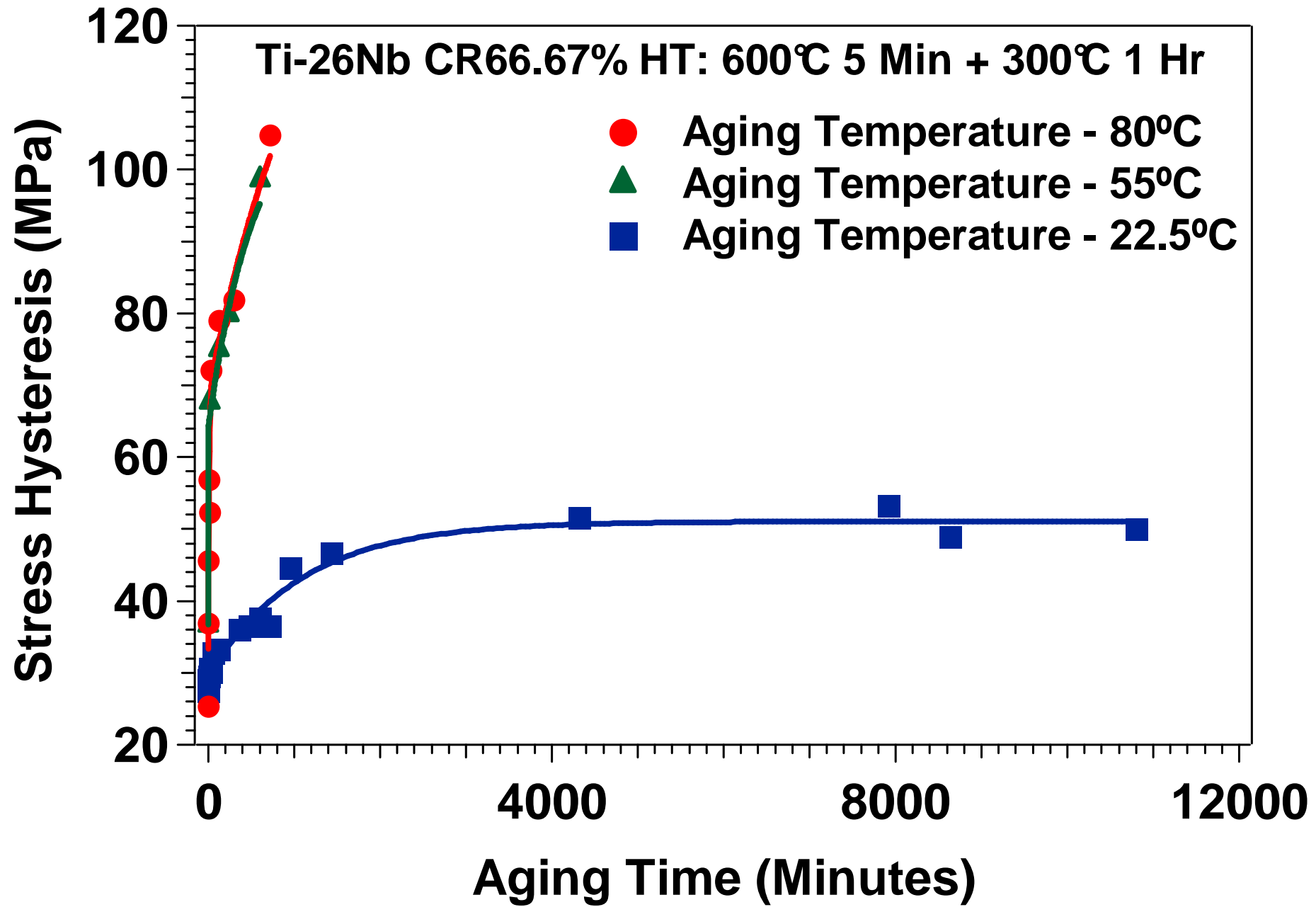
Department of Mechanical Engineering, Texas A&M University

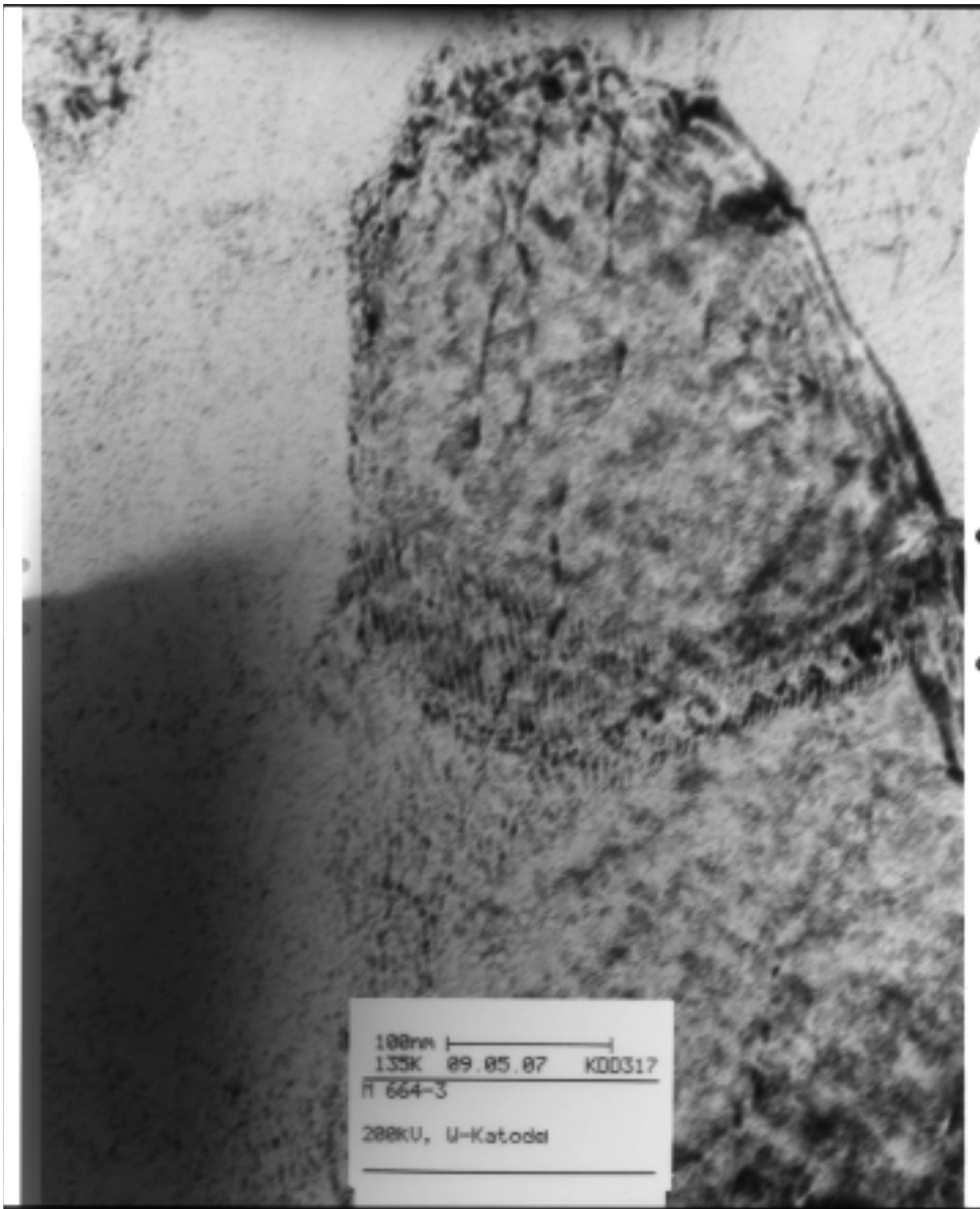




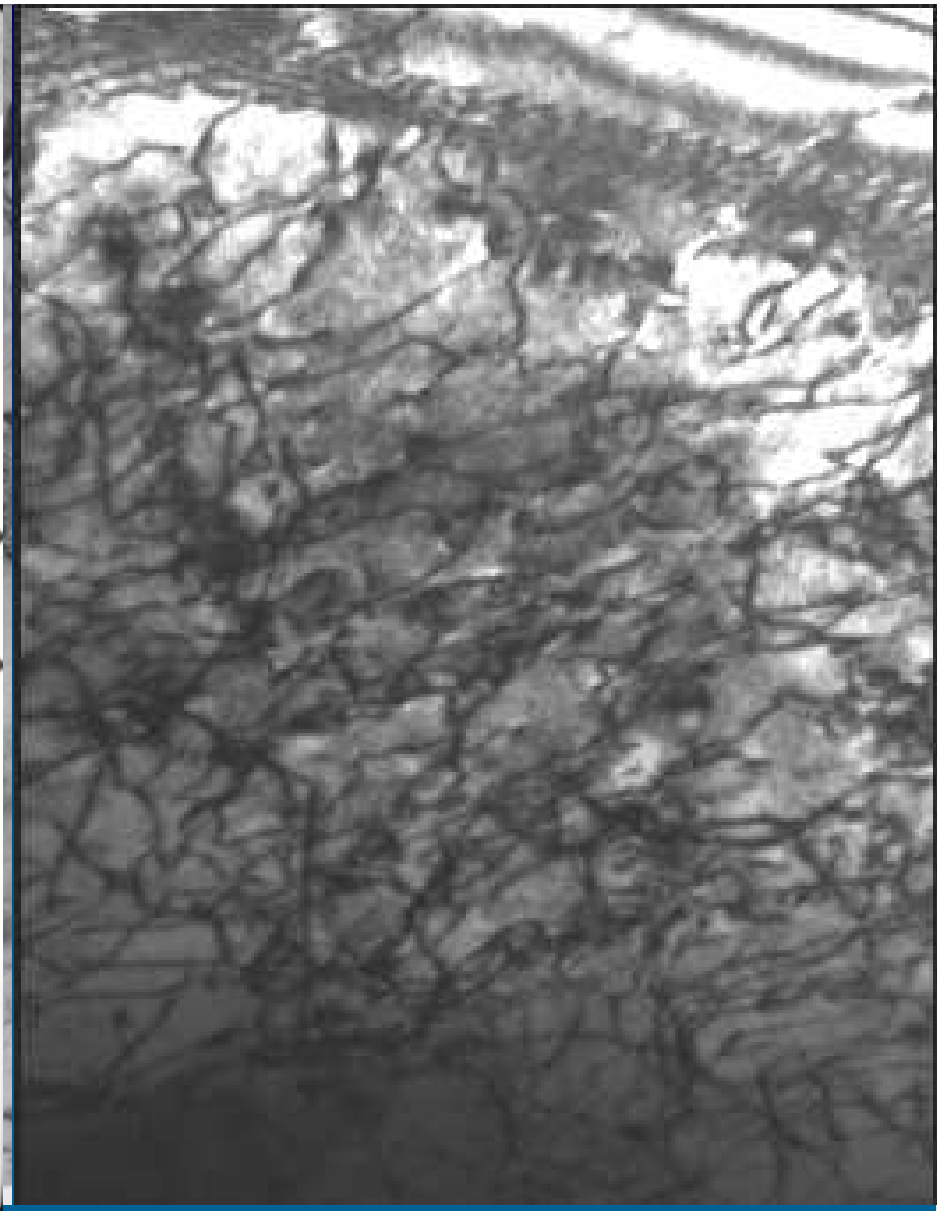




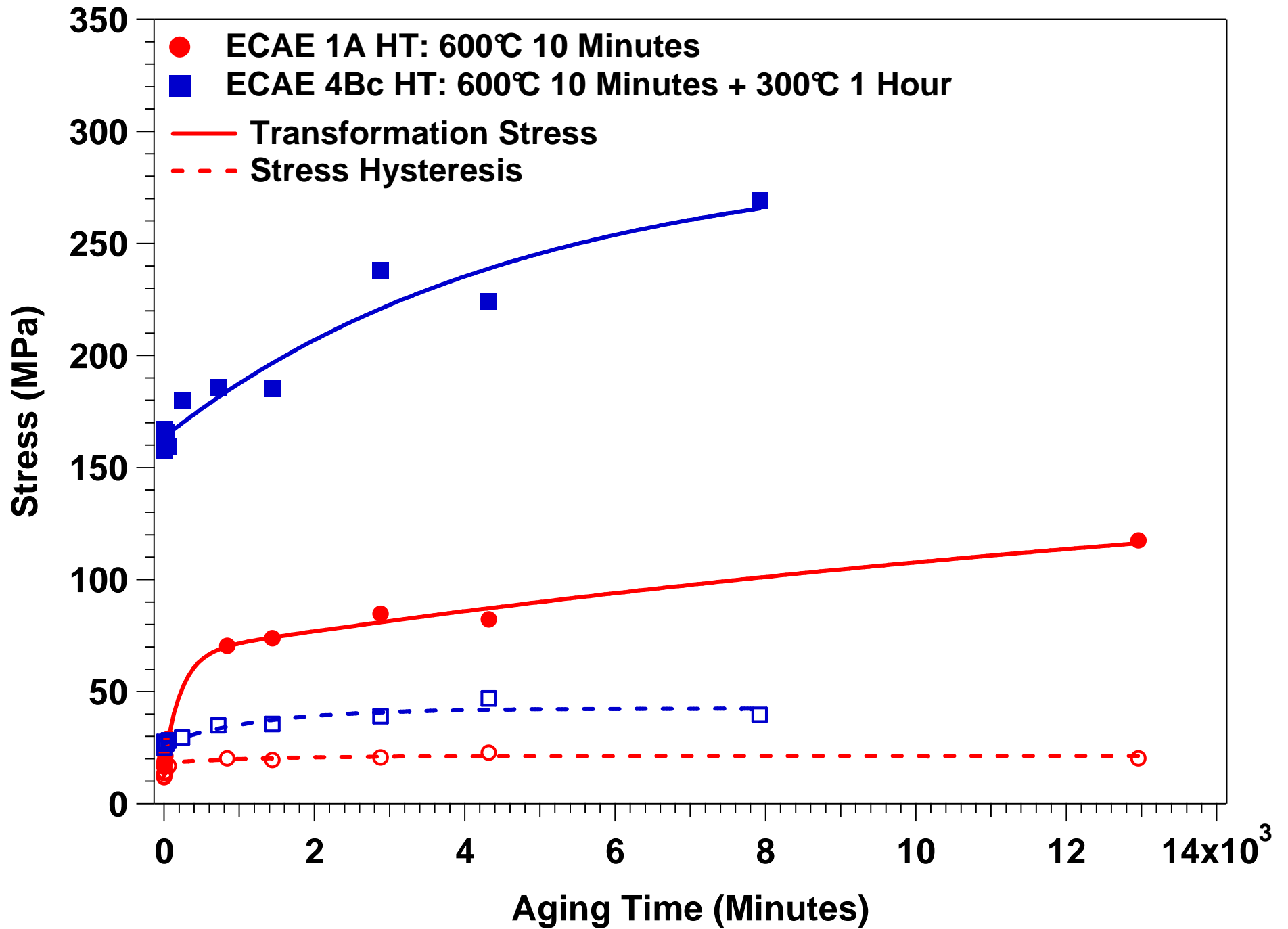


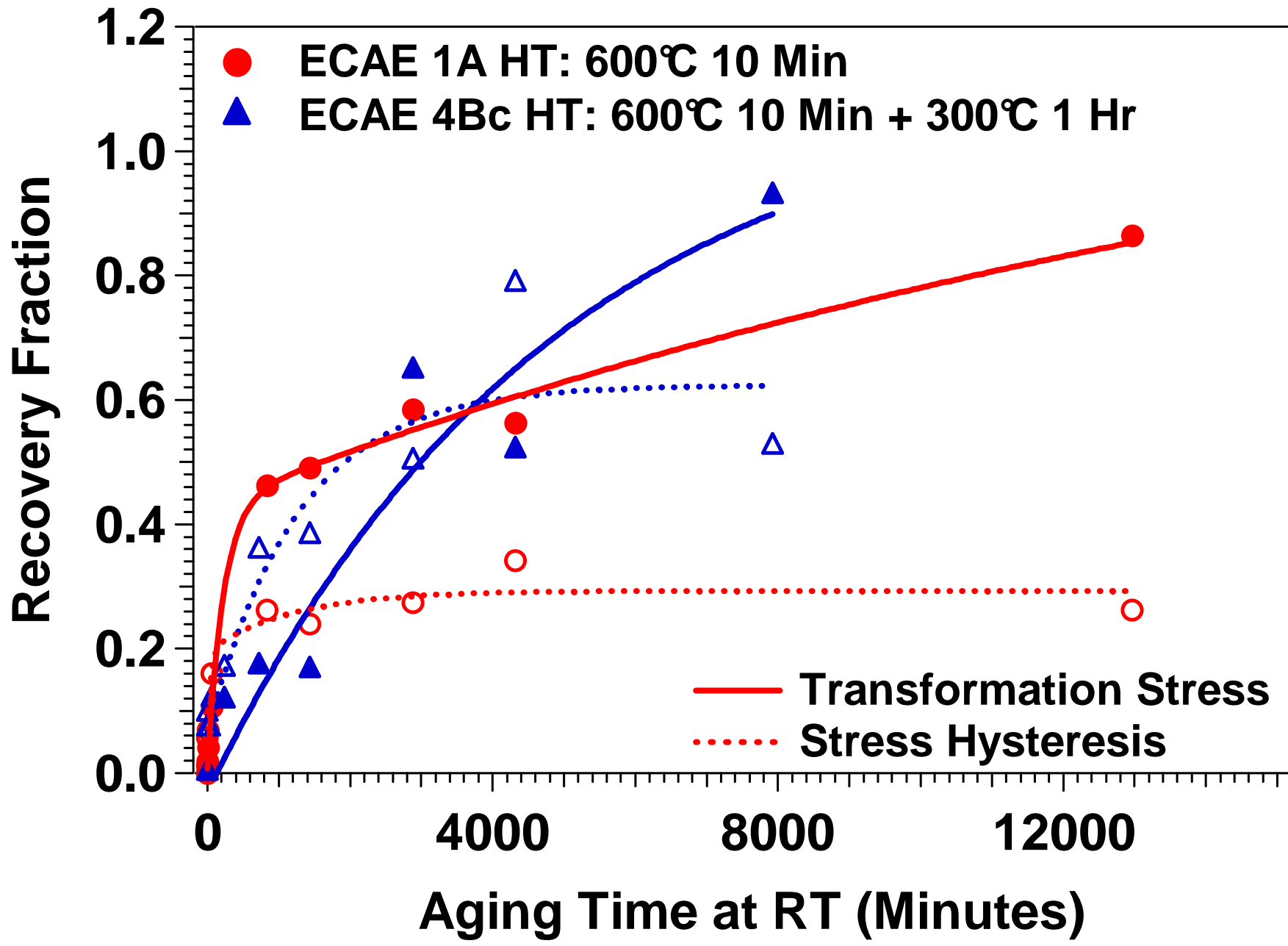


4Bc HT + PT

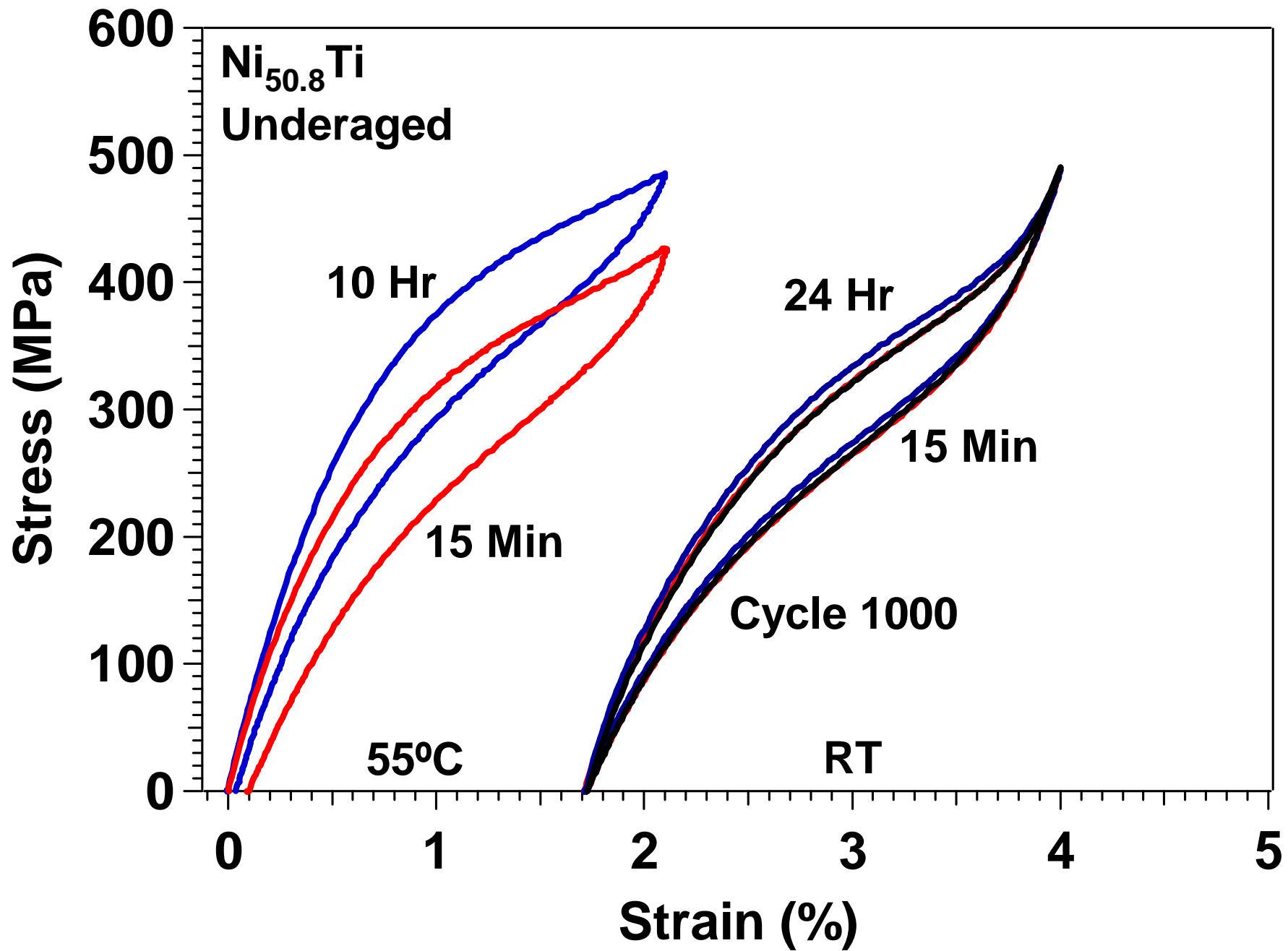


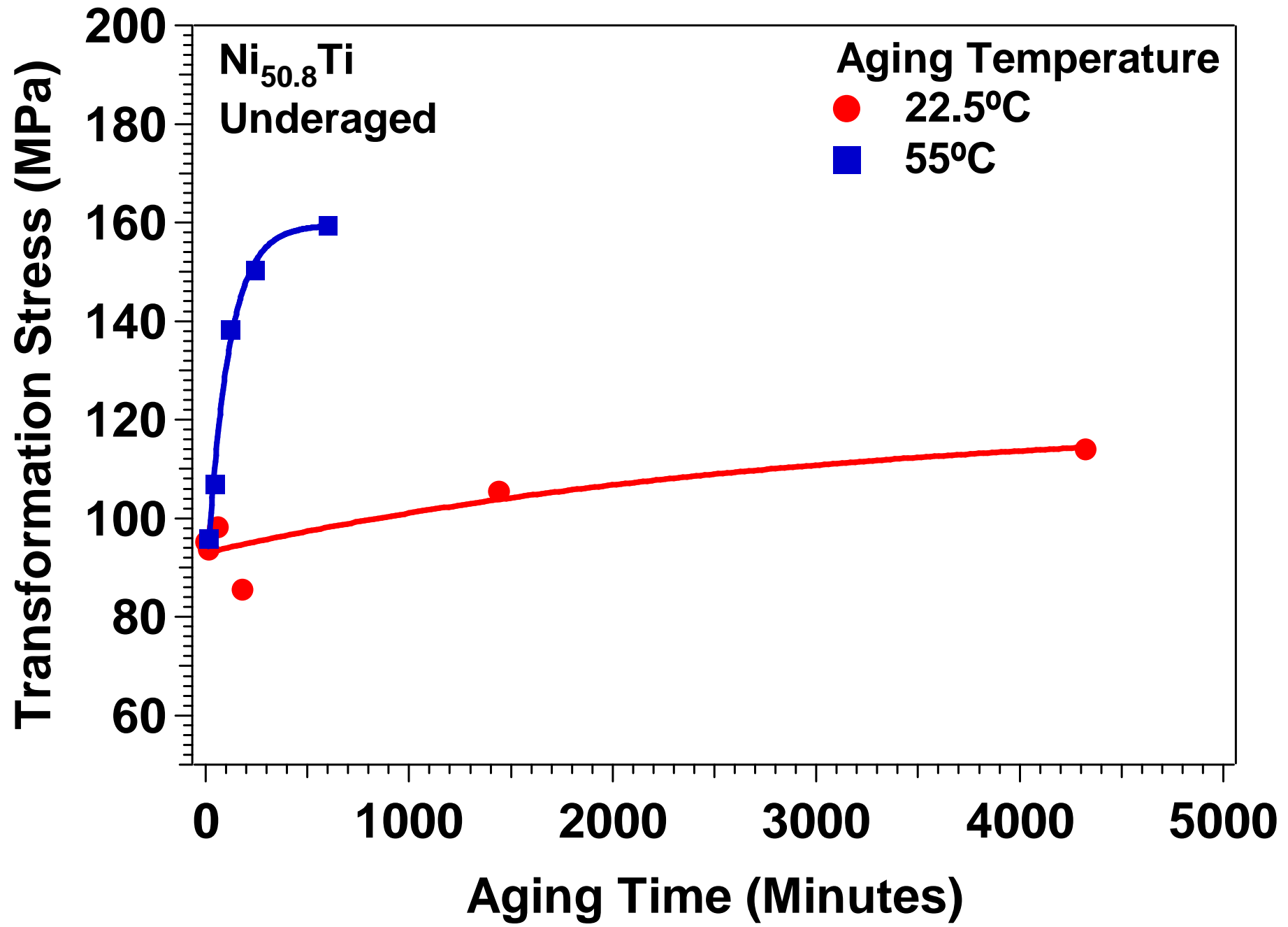
1A HT





A Strange Material?

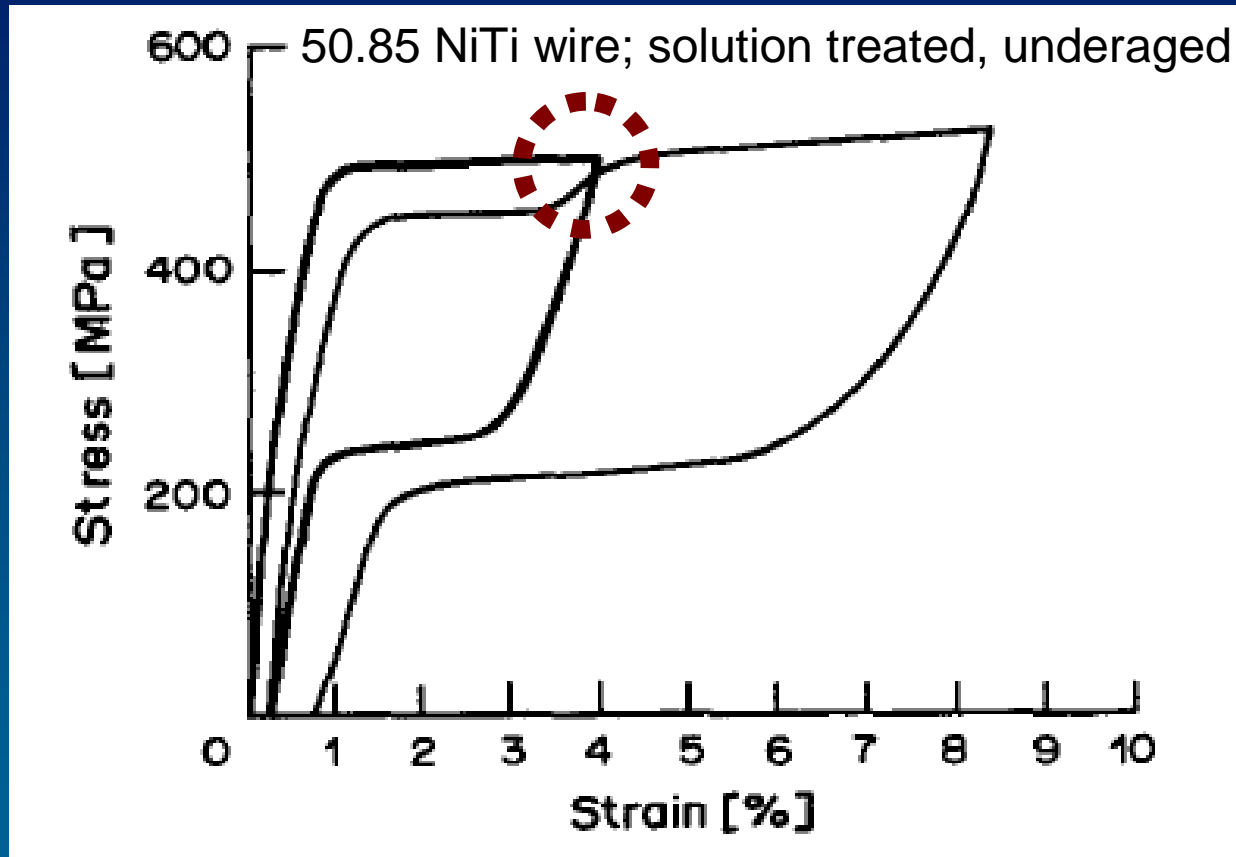




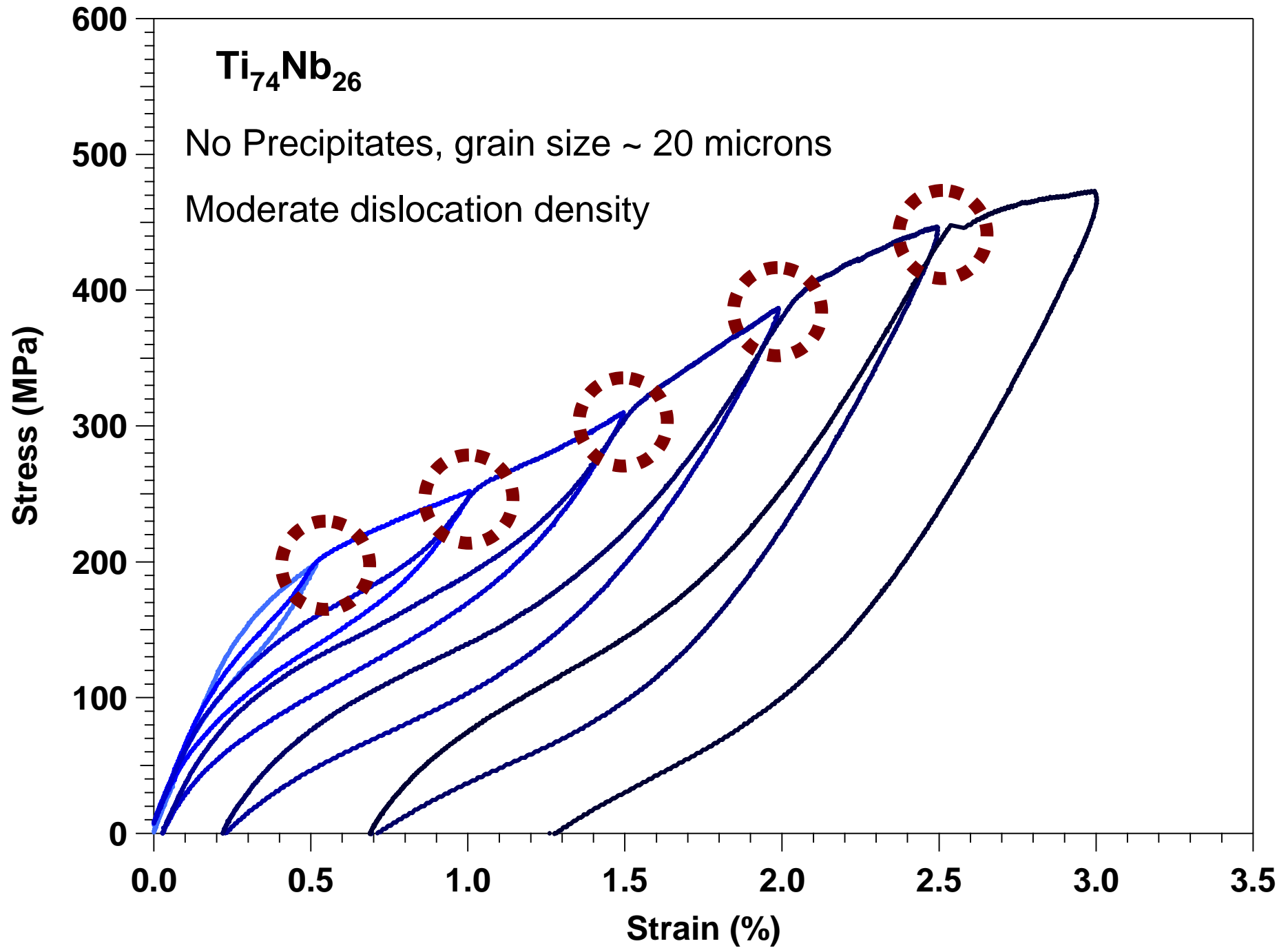
Room Temperature Recovery!

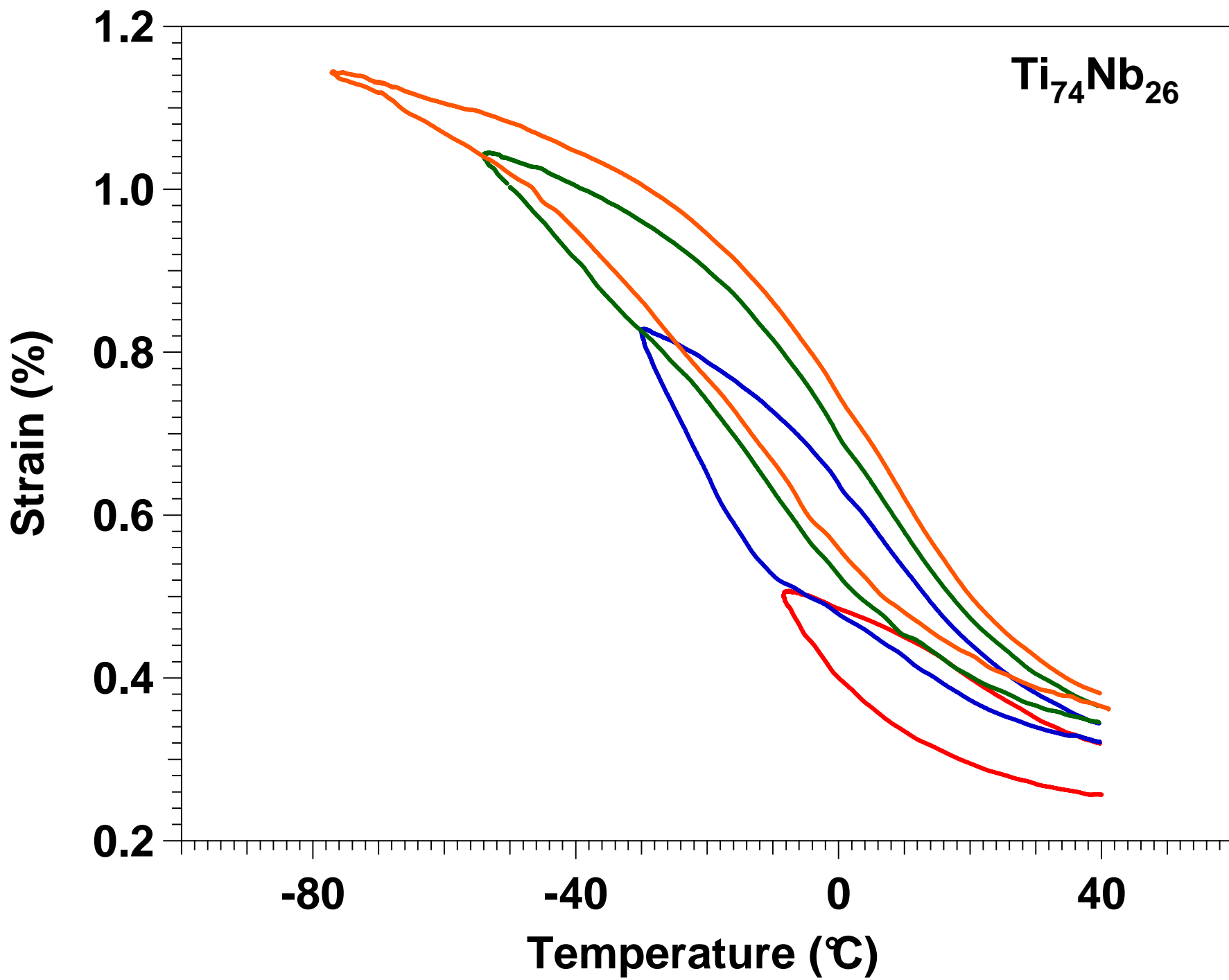
Recovery is affected by microstructure and composition

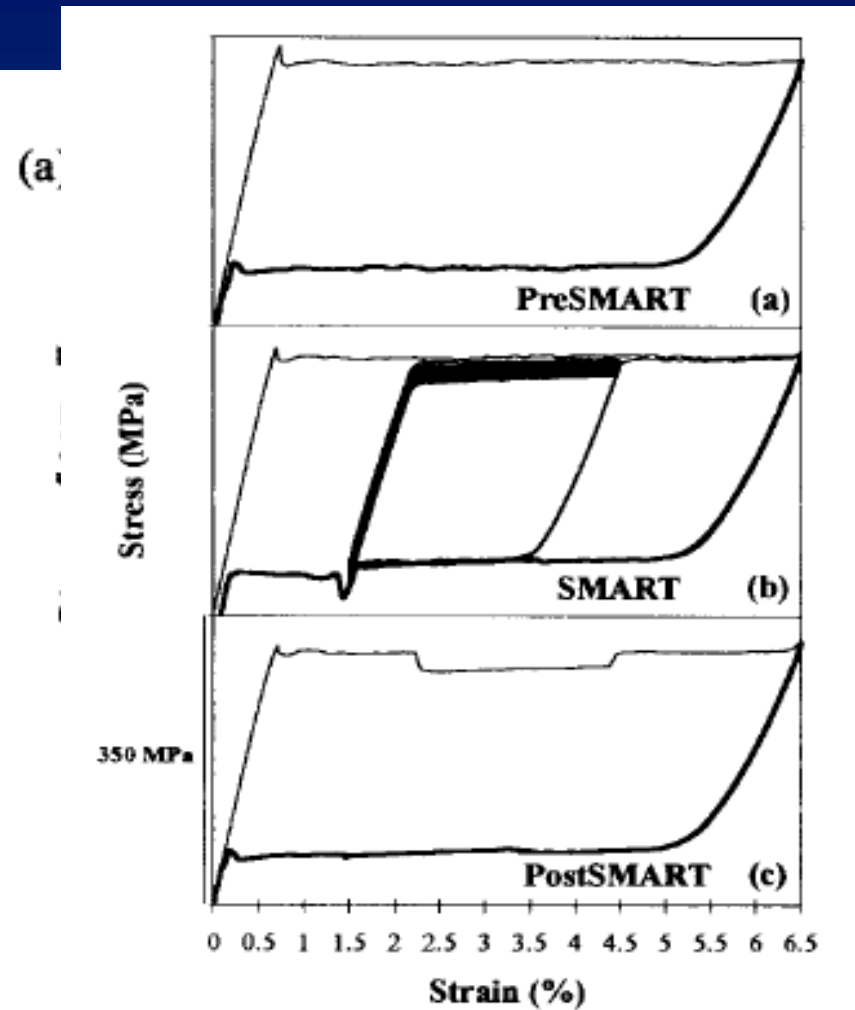
However, no single microstructure or alloy feature is REQUIRED for recovery



S. Eucken, T. Duerig, *Acta Metallurgica* 1989, 37, 2245.







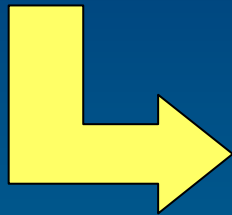
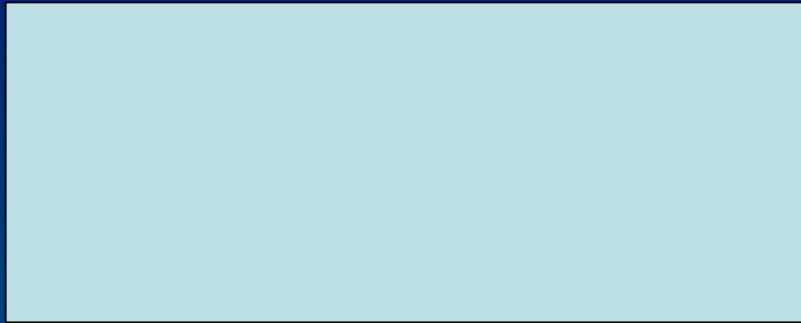
S. Eucken, T. Duerig, *Acta Metallurgica* **1989**, 37, 2245.
G. Airoidi, A. Corsi, G. Riva, *Journal de Physique IV* **1997**, C5, 513.

Pseudoelastic Cycling

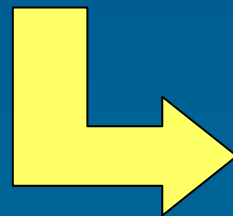
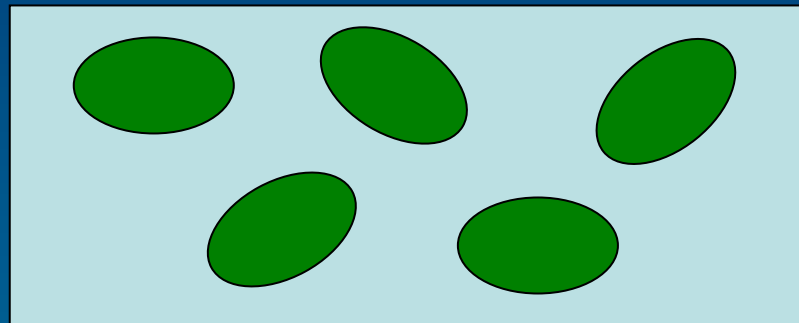
=

Transformation Memory Effect

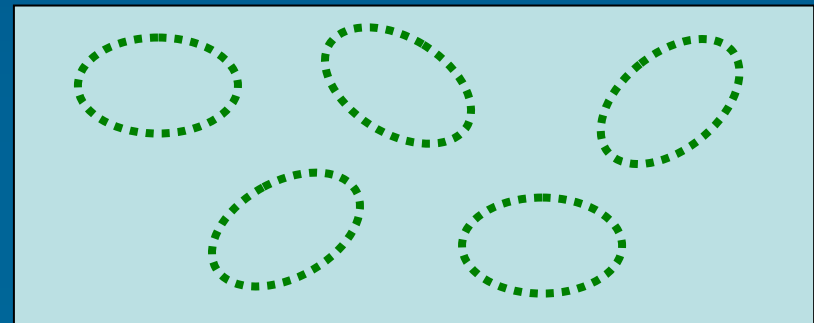
A Competition of Stability

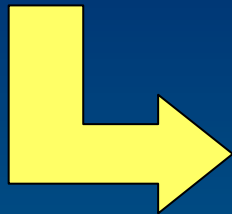
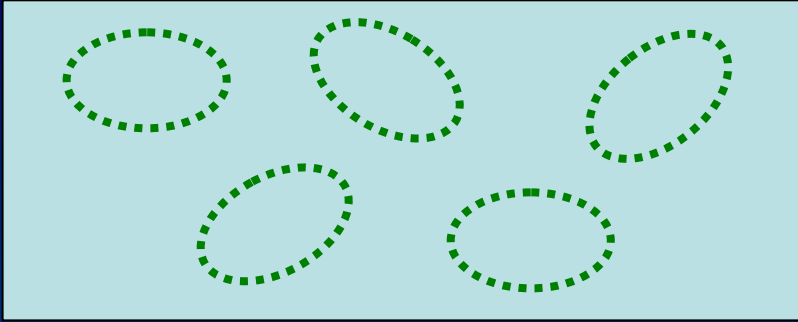


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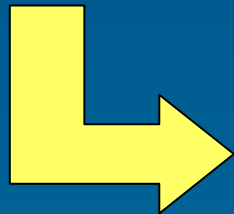
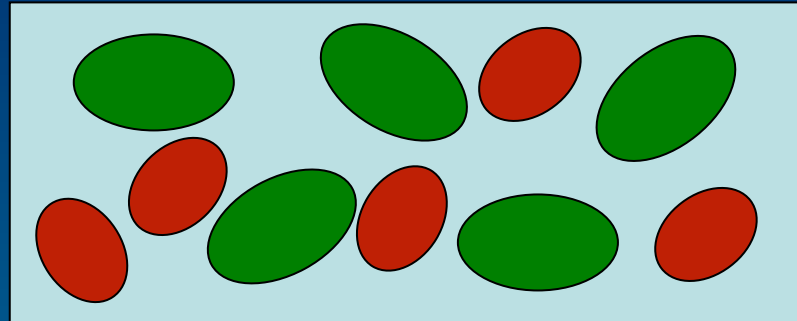


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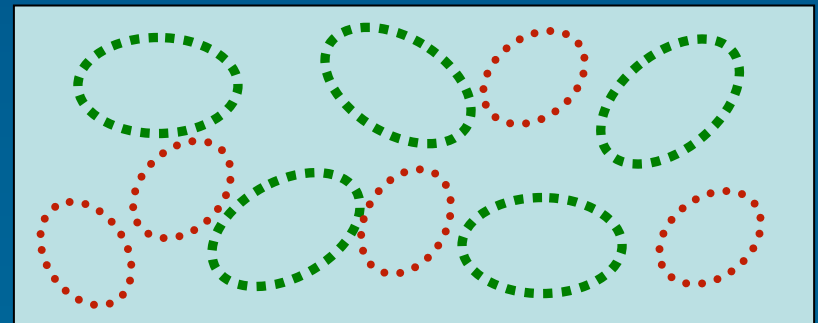


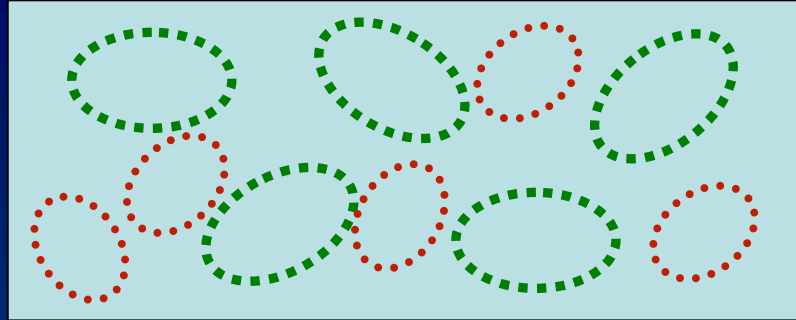


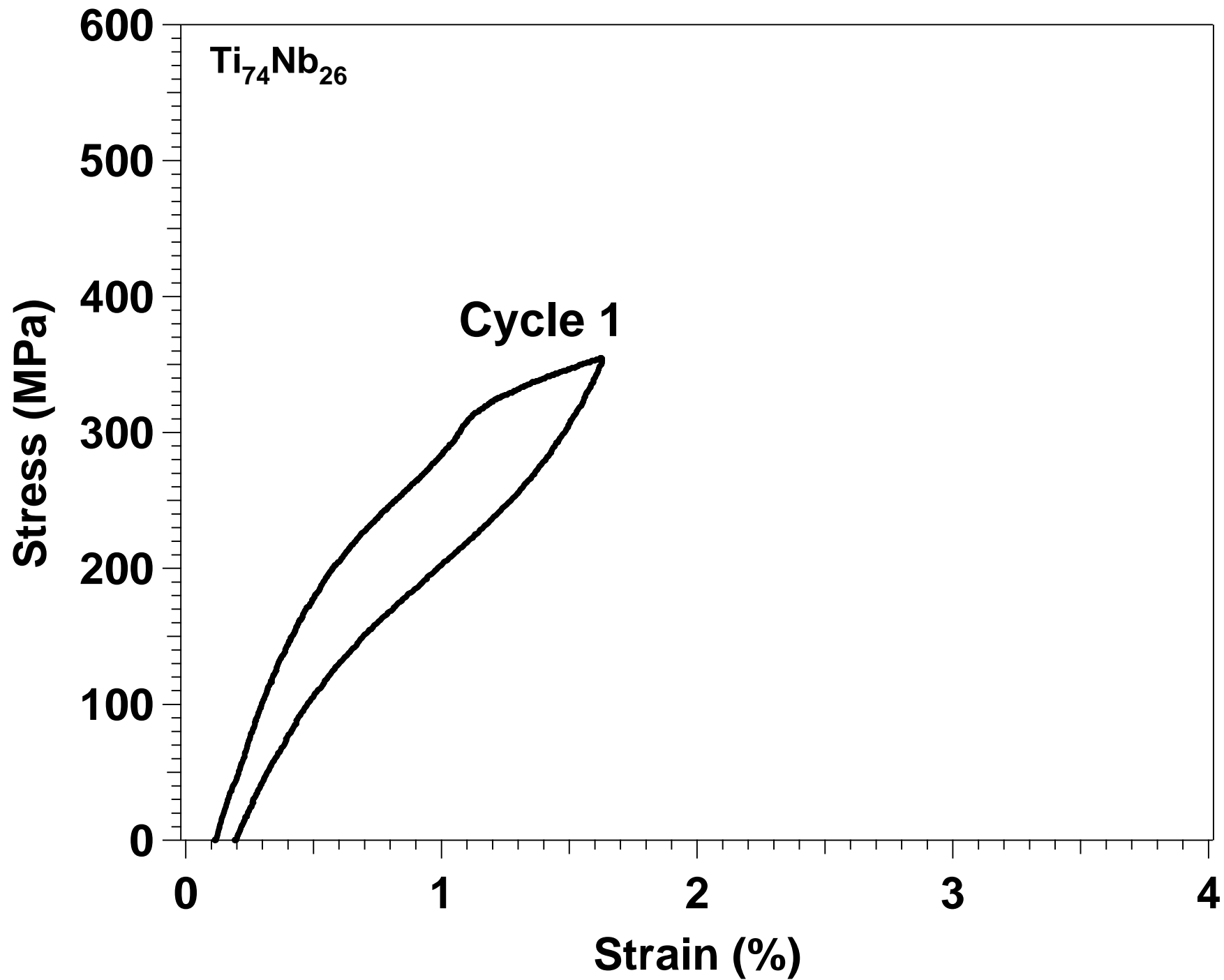
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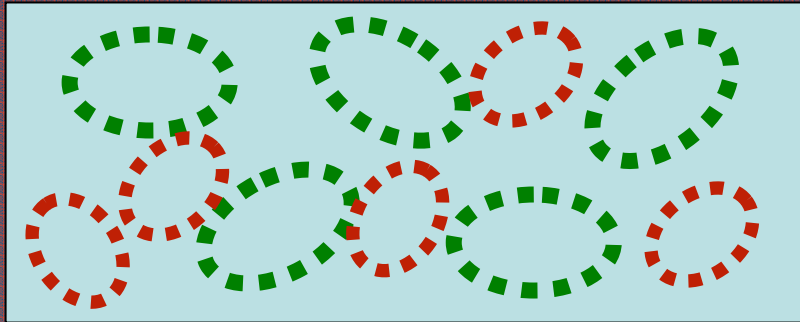
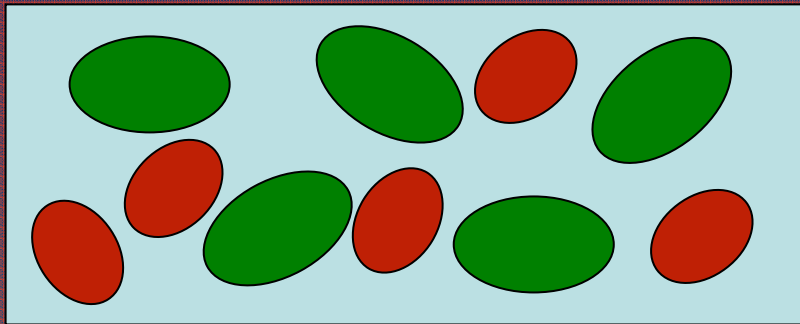
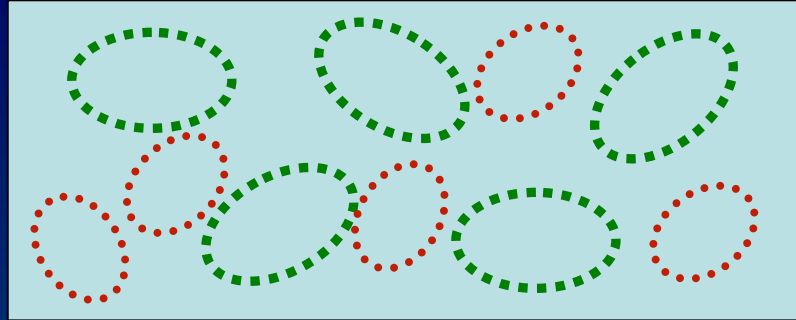


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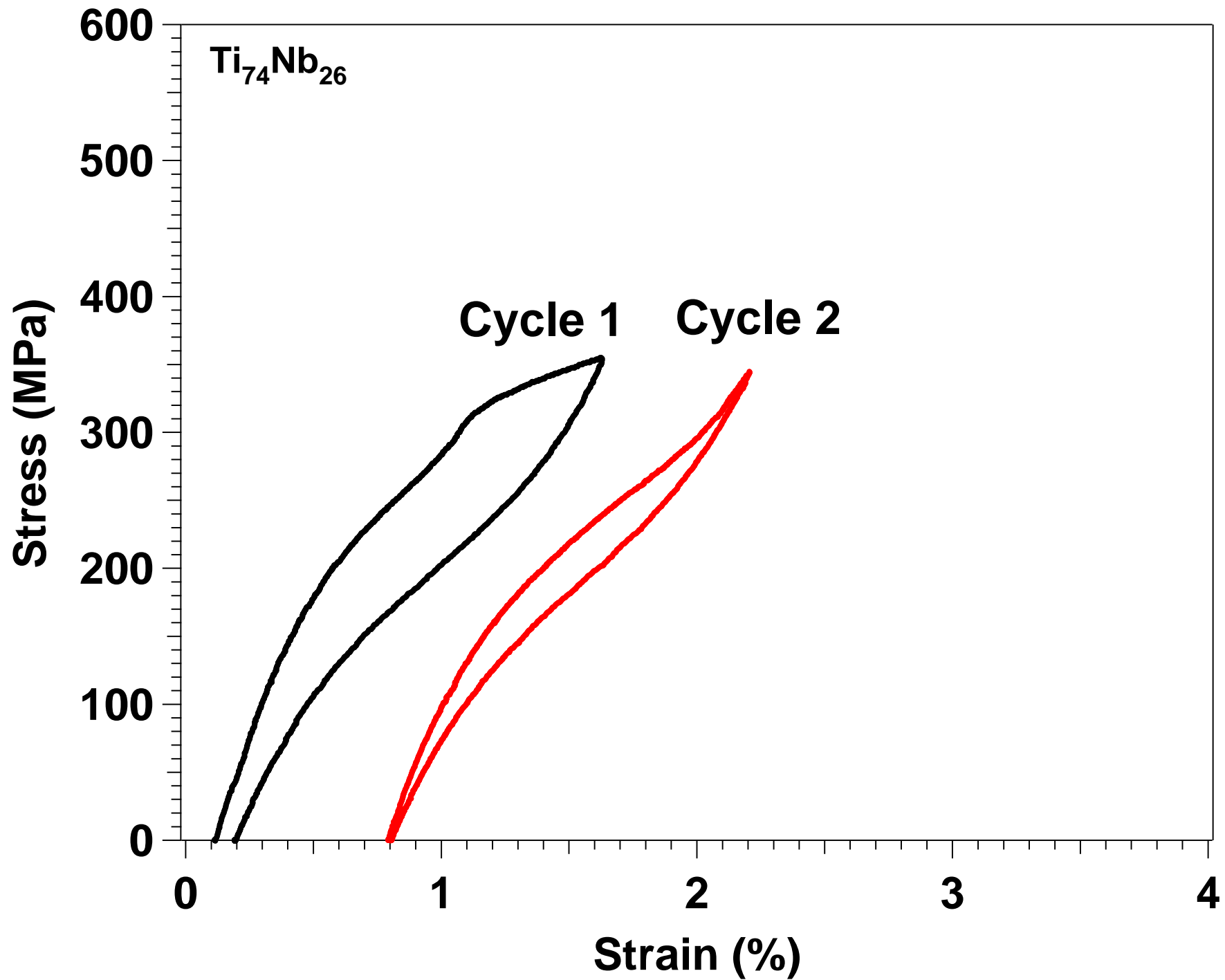


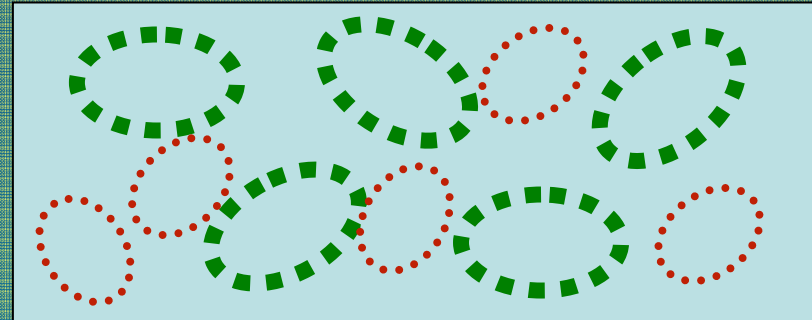
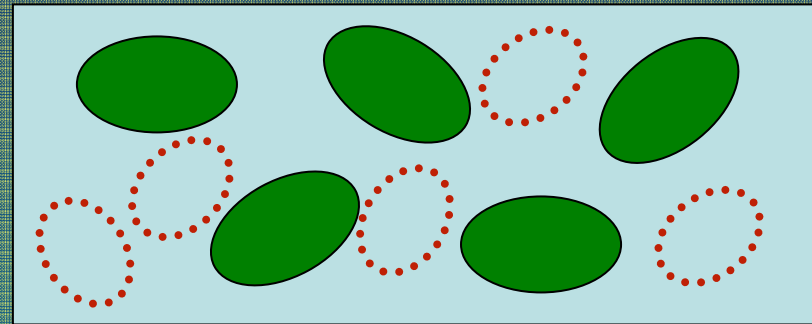
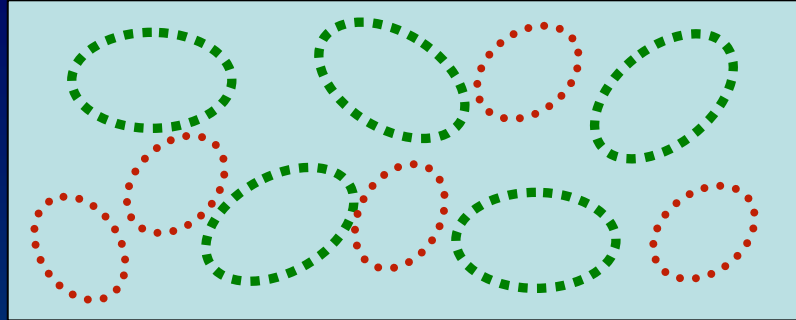




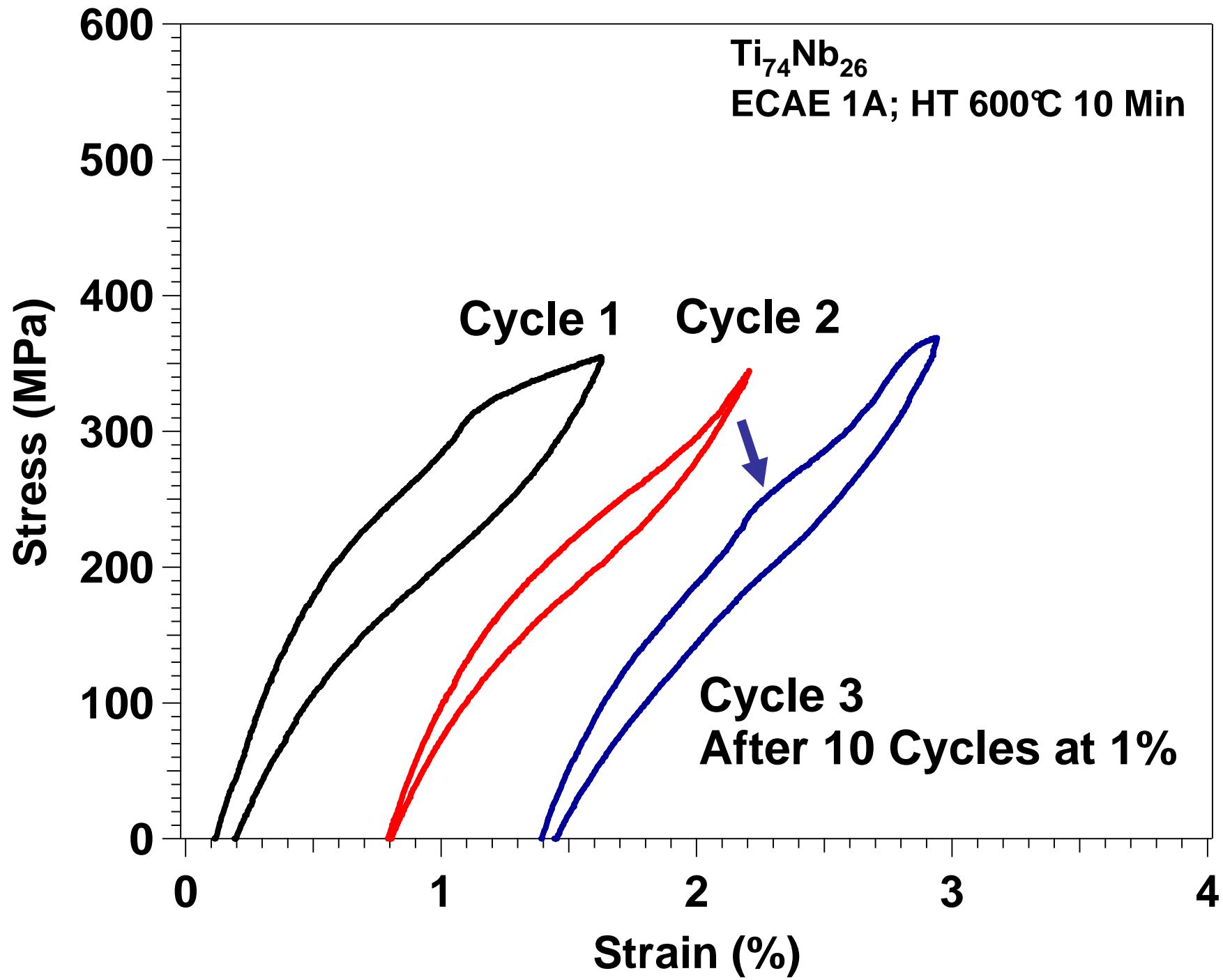


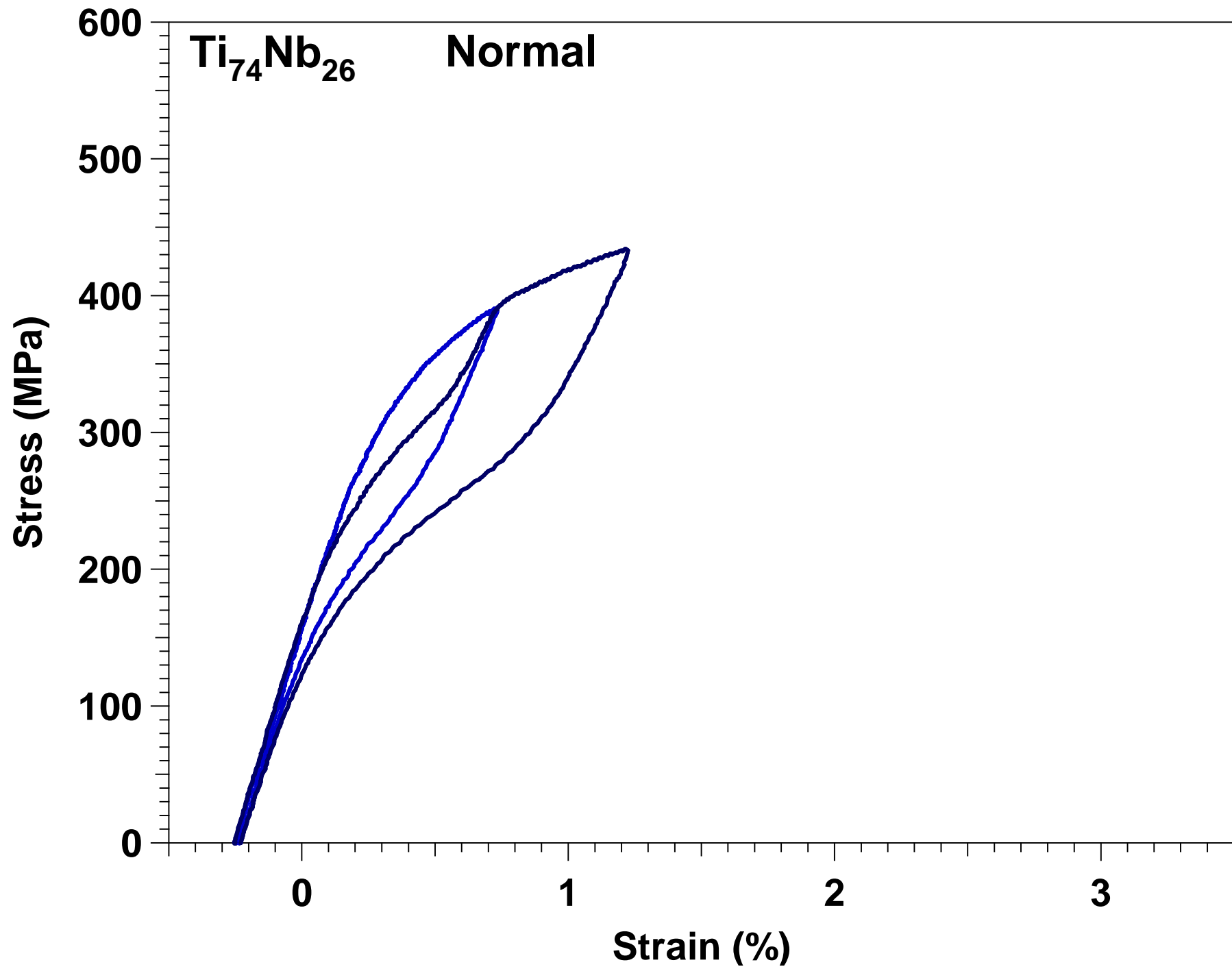
Case 1

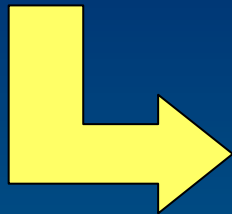
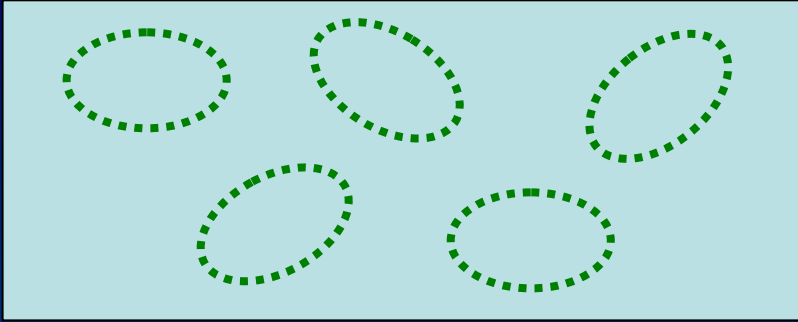




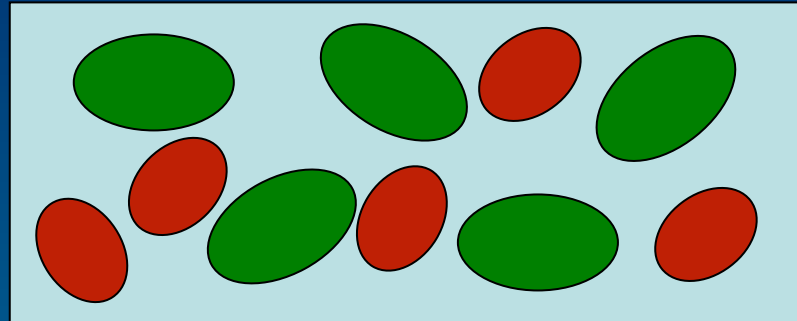
Case 2



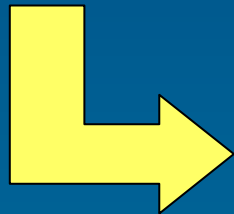




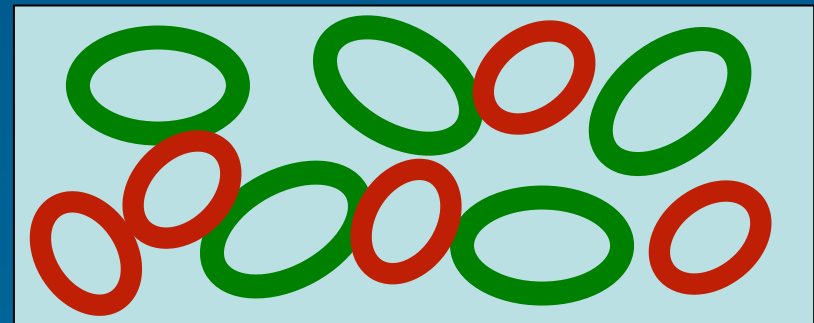
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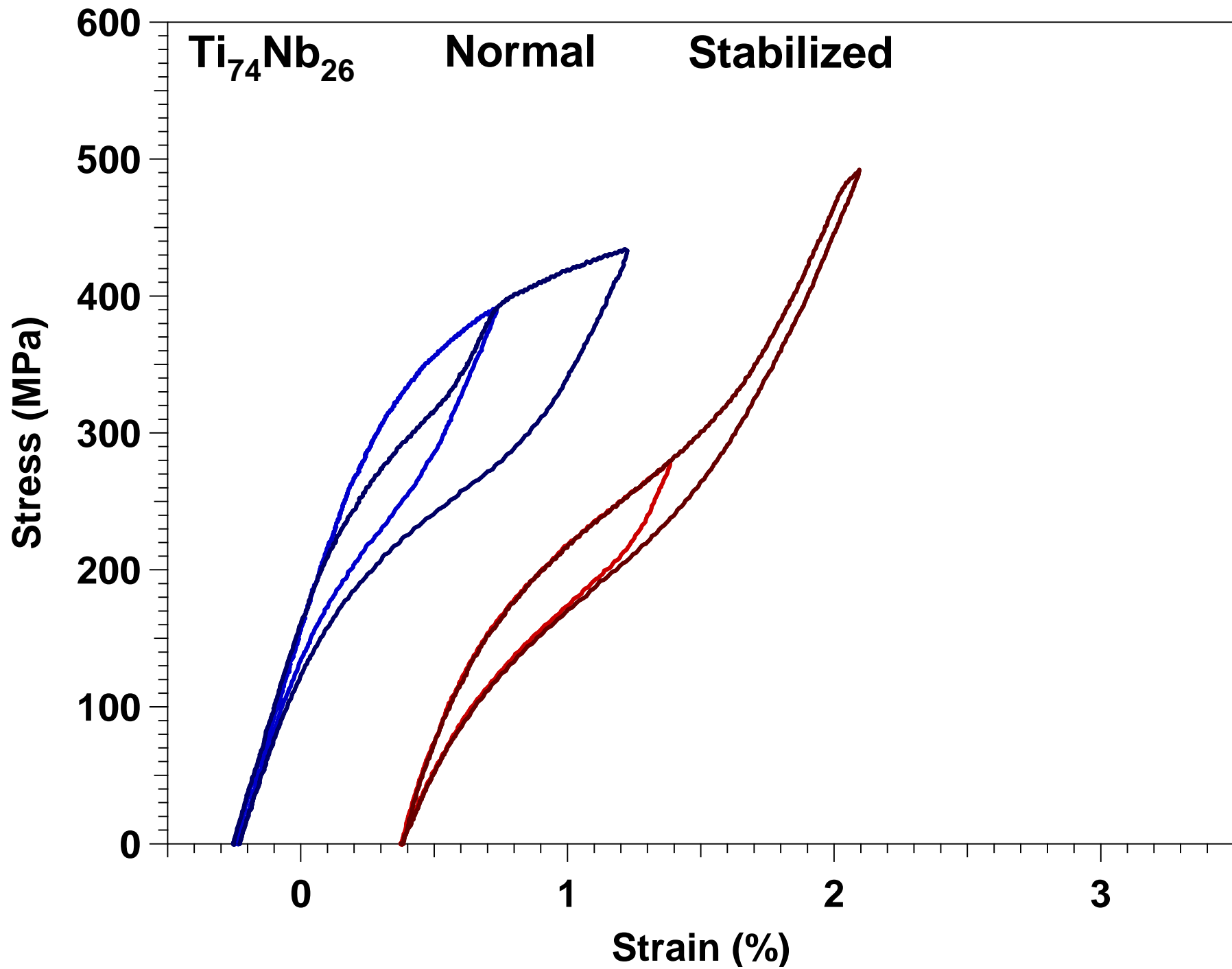


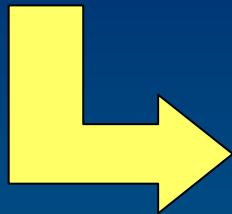
**500
cycles**



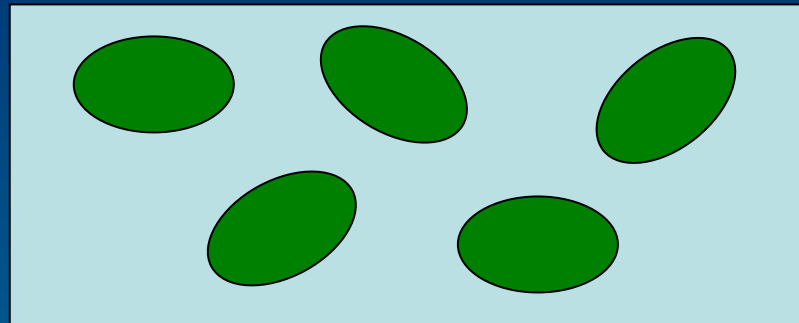
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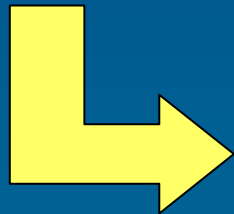




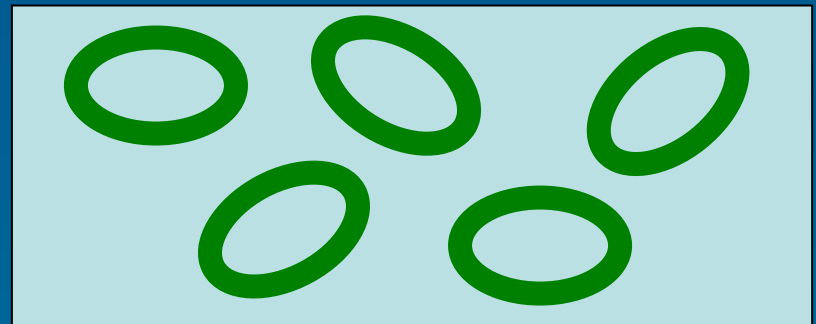
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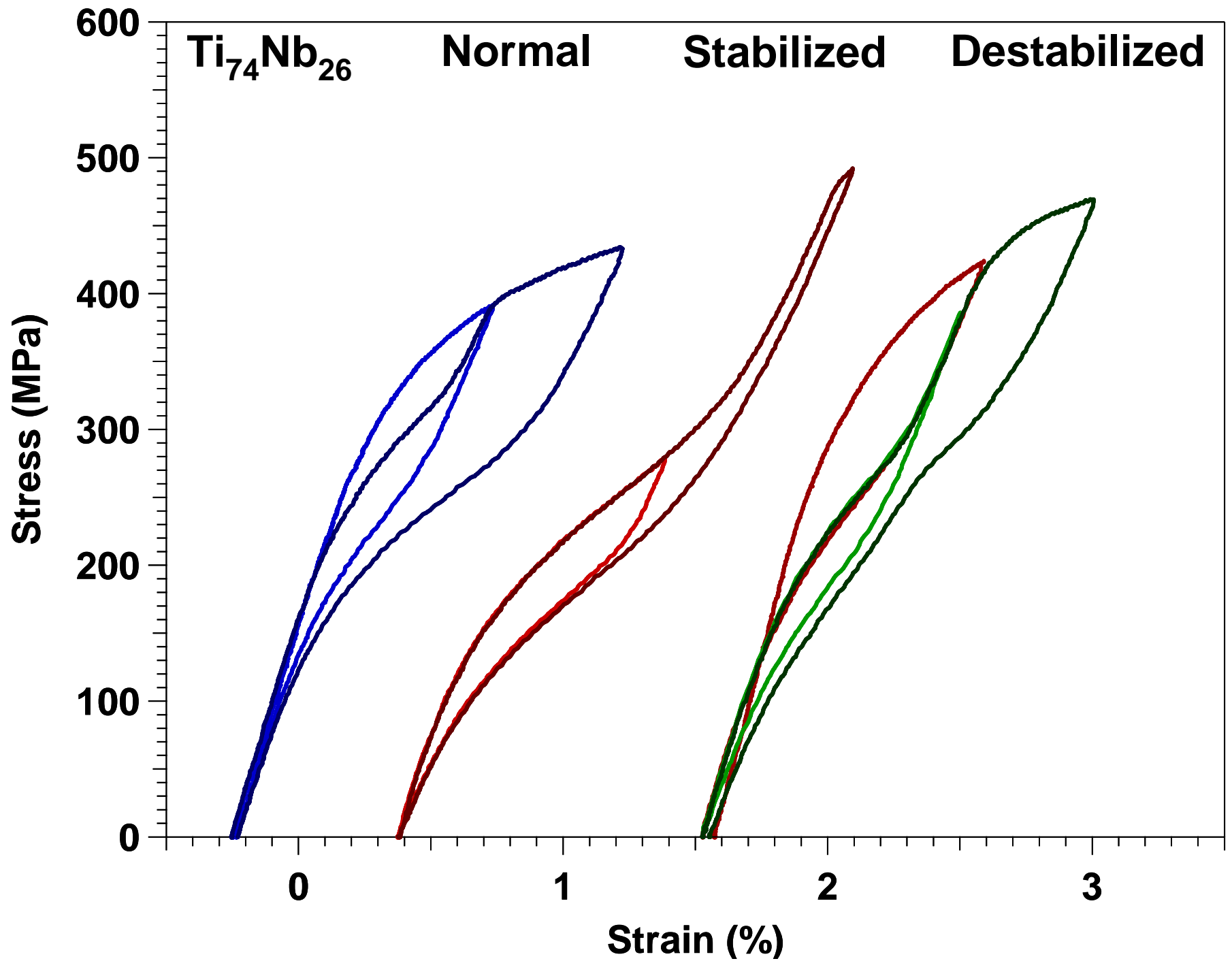


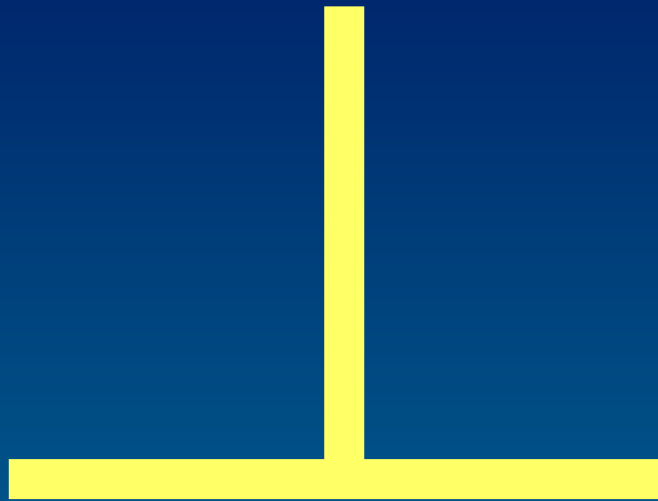
**500
cycles**



Unload







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Transformation Memory

Two-Way SME

150°C – 1 second

Disappears

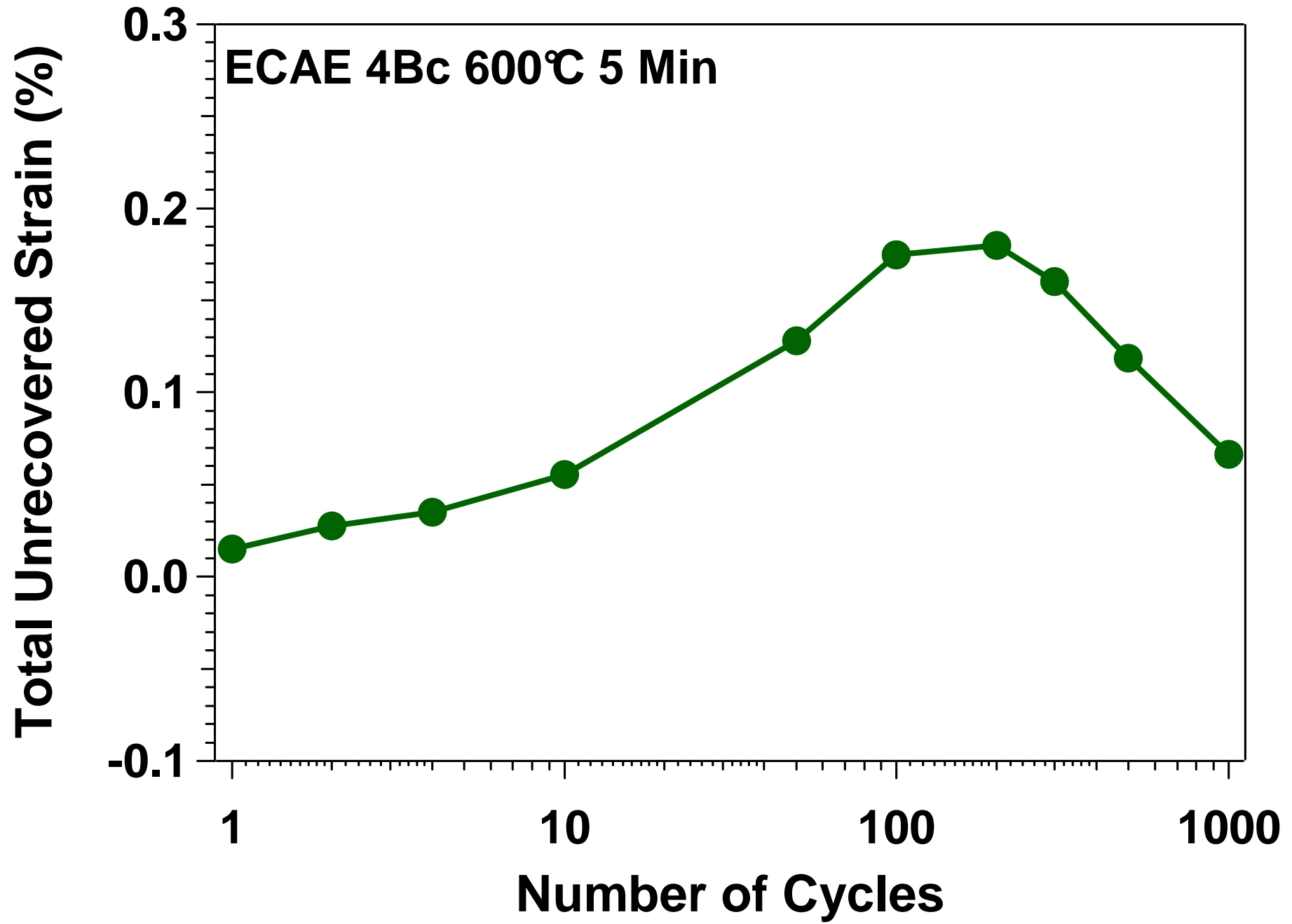
Remains

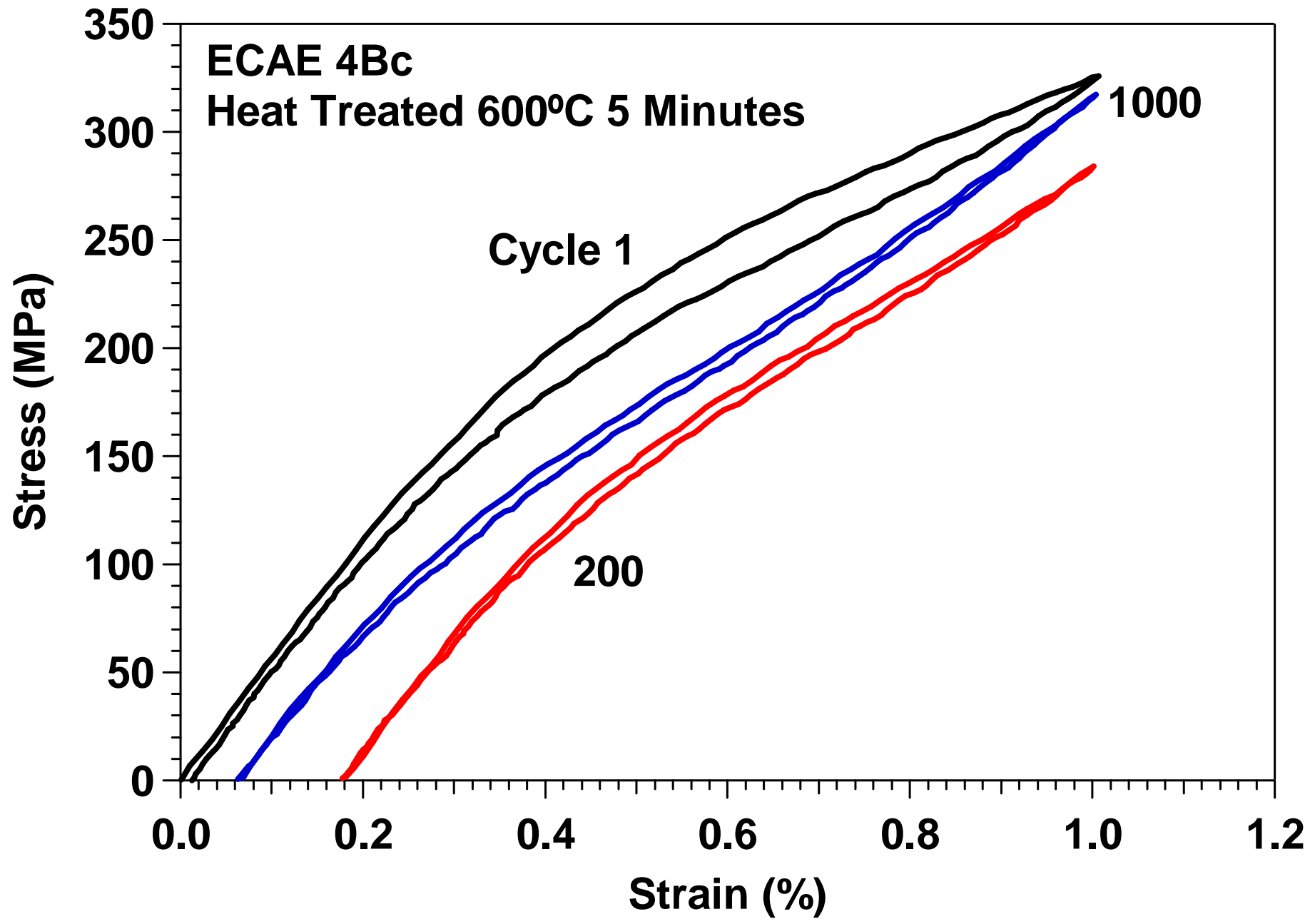


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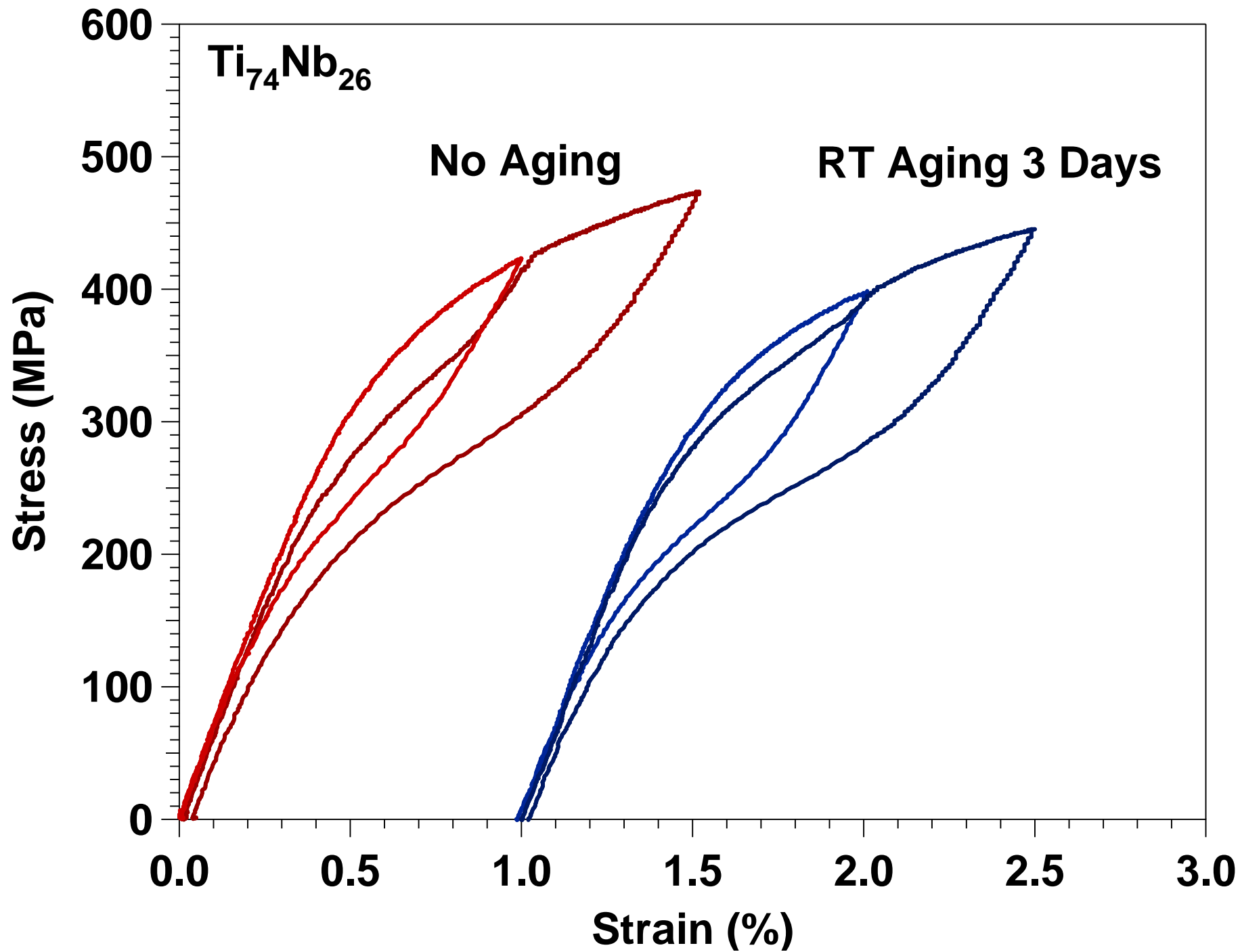
Furthermore...





More than one actor!

RT aging and transformation memory



Cumulative

Recoverable (Reversible?)

Time Dependent

Temperature Dependent

Thank You