



6-8 October / Ekim 2022

TÜYAP Fair and Congress Center, İstanbul - Turkey

Tüdöksad Akademi **11. Uluslararası Döküm Kongresi / 11th International Foundry Congress** by Tudoksad Academy

In conjunction with **ANKIROS / TURKCAST**

«Al11Si jantlarında Ti, Nb ve MTS tane inceltme ve mekanik özelliklere etkisi»

Ferhat AYDOĞAN, Kerem Can Dizdar**, Hayati Şahin**, Elvan Bilge MENTEŞE*, Derya Dişpınar****

**Döktaş Dökümcülük Tic. Ve San. A.Ş., Manisa, Türkiye*

***İstanbul Teknik Üniversitesi, İstanbul, Türkiye*

****FOSECO, İstanbul, Türkiye*








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ÇALIŞMANIN AMACI

- AlTi5B1'in olumsuz etkileri: TiB₂ zamana bağlı solması(fading) ve heterojen tane yapısı
- Alternatif tane incelticilerin araştırılması
 - AlNb3B0,55 → 
 - Nucleant 1582 → 
- Üç farklı tane incelticinin Al11Si alaşımının mikroyapısı ve mekanik özellikleri üzerine etkisi araştırılmıştır.
- Denemeler Döktaş Dökümcülük Tic. ve San. A.Ş.'de TÜBİTAK projesinin iş paketlerinde gerçekleştirilmiştir. → 









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DENEME PARAMETRELERİ

Tane İnceltici	Kullanım Miktarı	DI (Yoğunluk İndeksi)	Gaz Giderme Parametreleri	Kalıp Sıcaklıkları	Maden Sıcaklığı
AlTi5B1 	%0,11 Ti ağırlıkça	7,9	375 sn Ar ve 60 sn H gazı	Basamak 350°C	Her Deneme Turu (5'er döküm) 715-690°C
AlB3 	%0,02 ve %0,03 B ağırlıkça	8	Devir; vorteks 500 rpm, gaz giderme 400rpm	Çekme 340°C	
AlNb3B0,55 	%0,03 - %0,06 ve %0,1 Nb ağırlıkça	9		Ördek Ayak 320°C	
Nucleant 1582 	450 gr	9		Spiral 310°C	

%Si	%Fe	%Cu	%Mn	%Mg	%Zn	%Ni	%Sr	%Ti
10.794	0.128	0.0031	0.0039	0.140	0.010	0.004	0.037	0.090



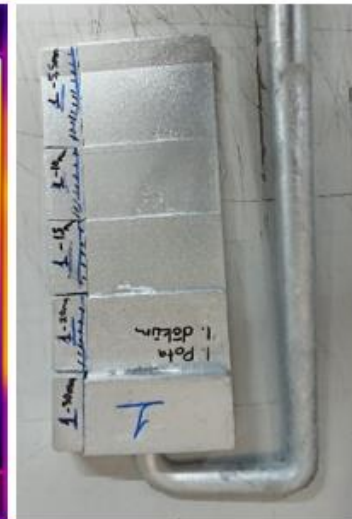
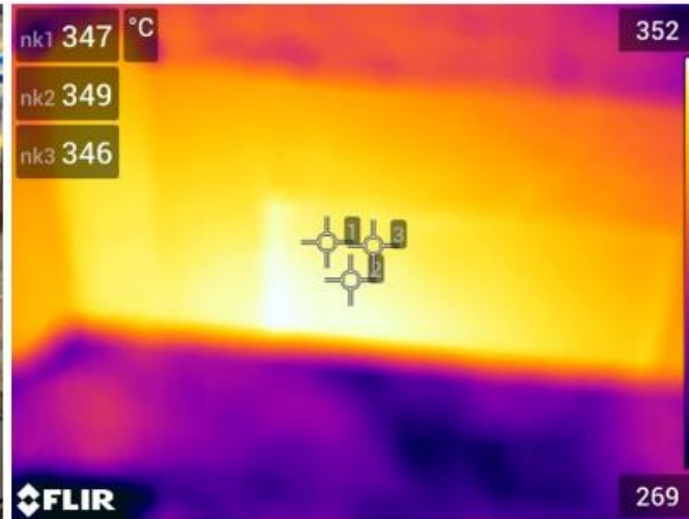


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0.03 Nb



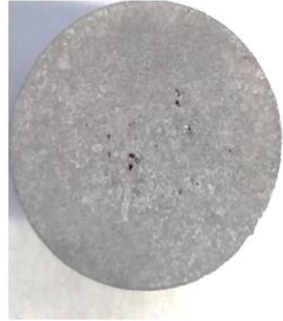
0.06 Nb



0.1 Nb



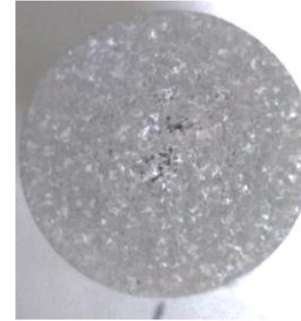
0.02 B



0.03 B



N 1582



Ti

Grain Refiners	AINb3B0,55 0.03 %	AINb3B0,55 0.06 %	AINb3B0,55 0.1 %	AIB3 0.02 %	AIB3 0.03%	MTS1582 450 gr	AITi5B1 0.11%
Grain Size number	8.8	8.8	9.8	7.4	7.9	7.4	7.5





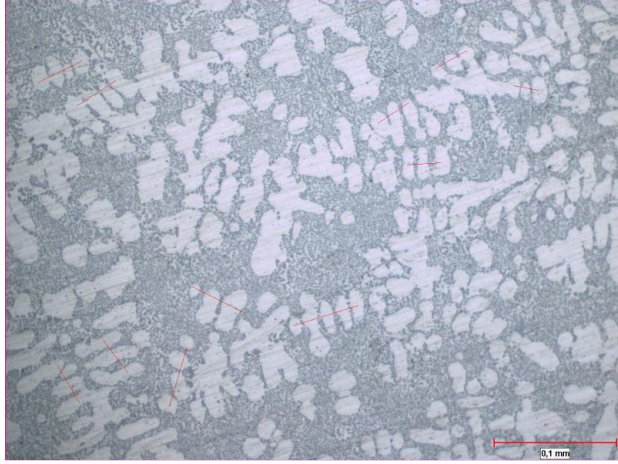
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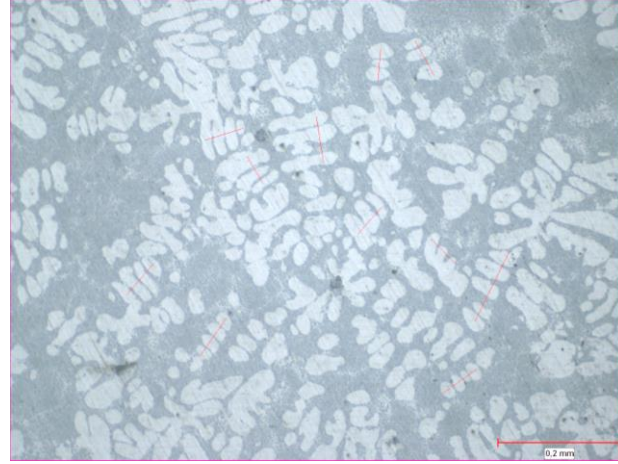
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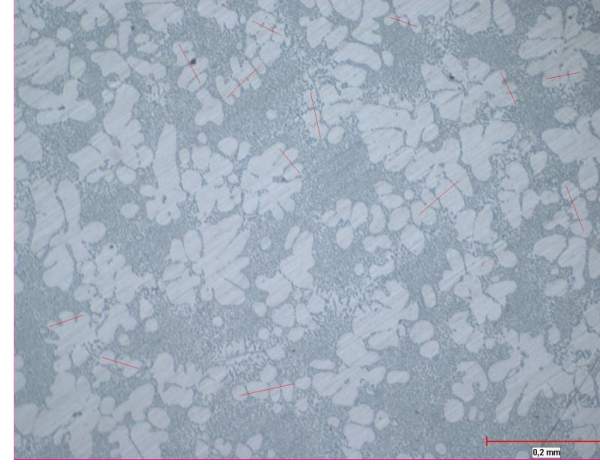
SDAS ve DAS Mikroyapıları



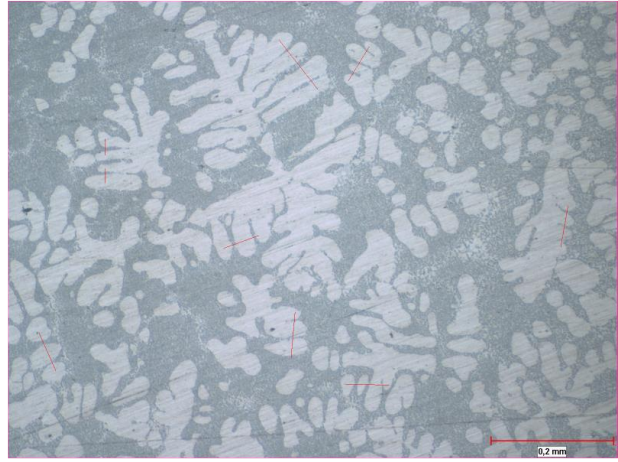
0.03 Nb



0.06 Nb



0.1 Nb



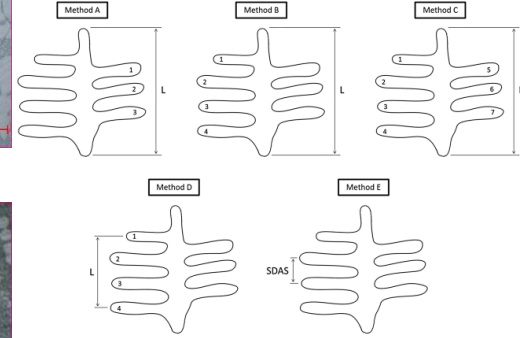
0.02 B



N 1582



Ti



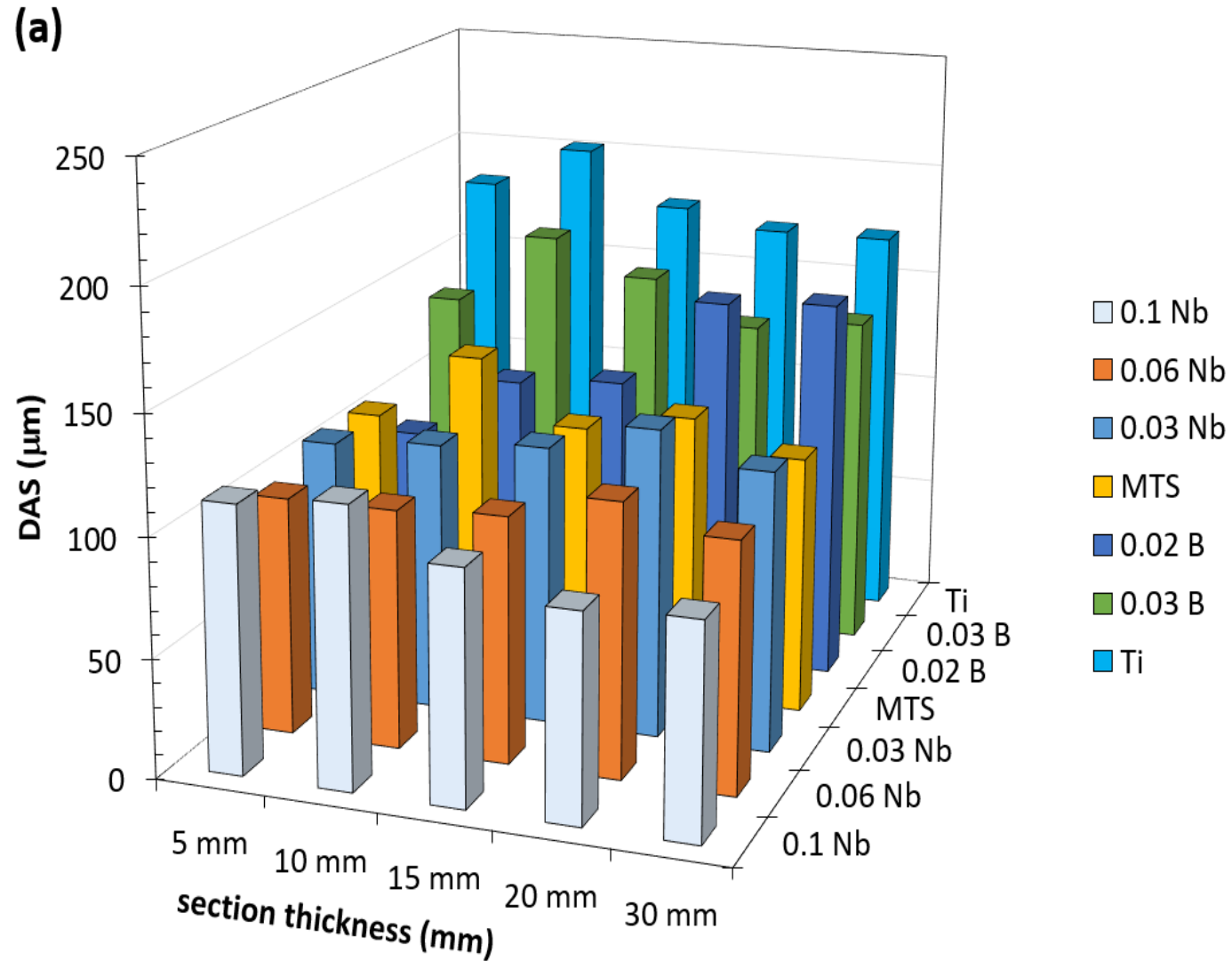


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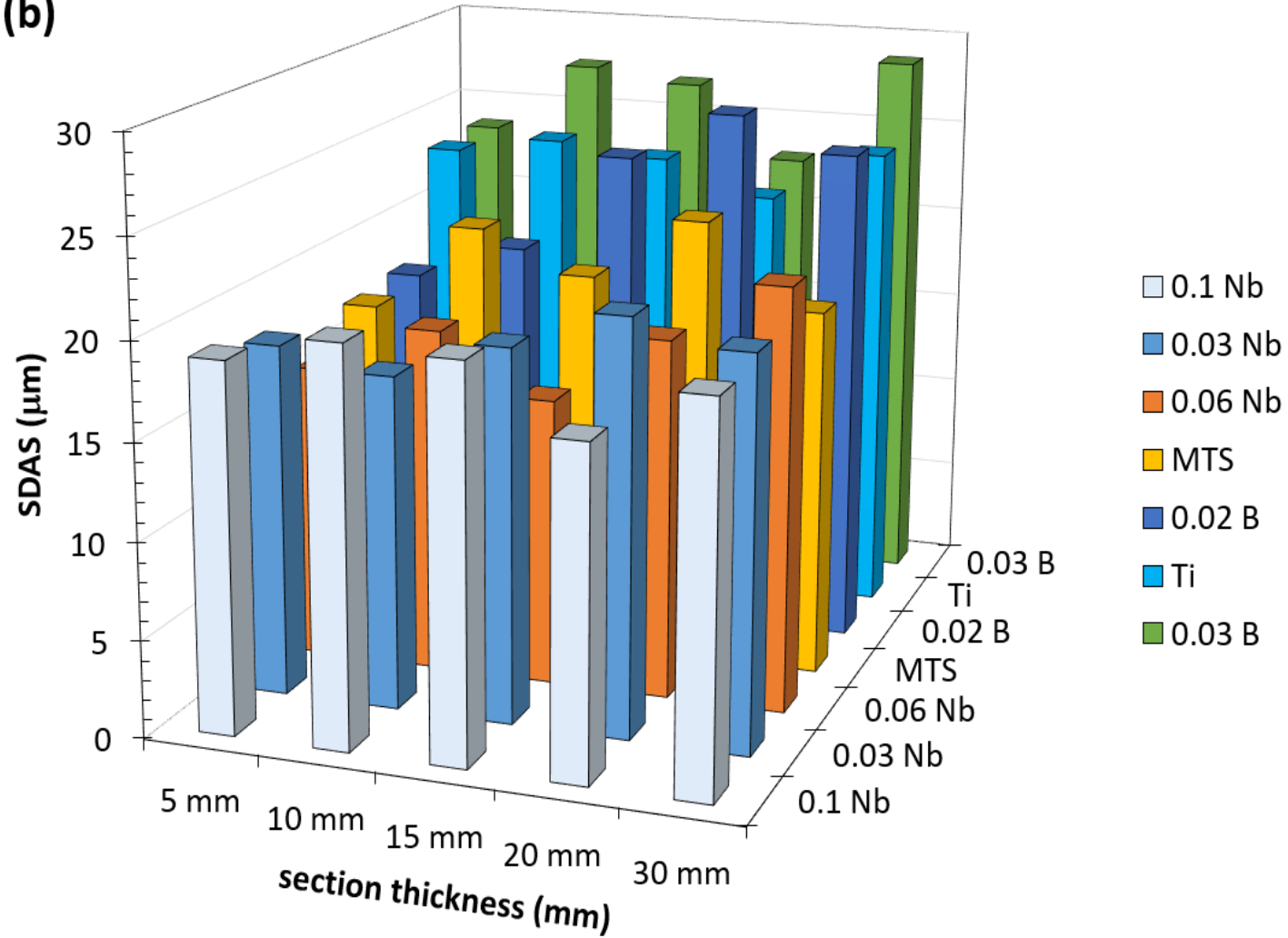
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(b)



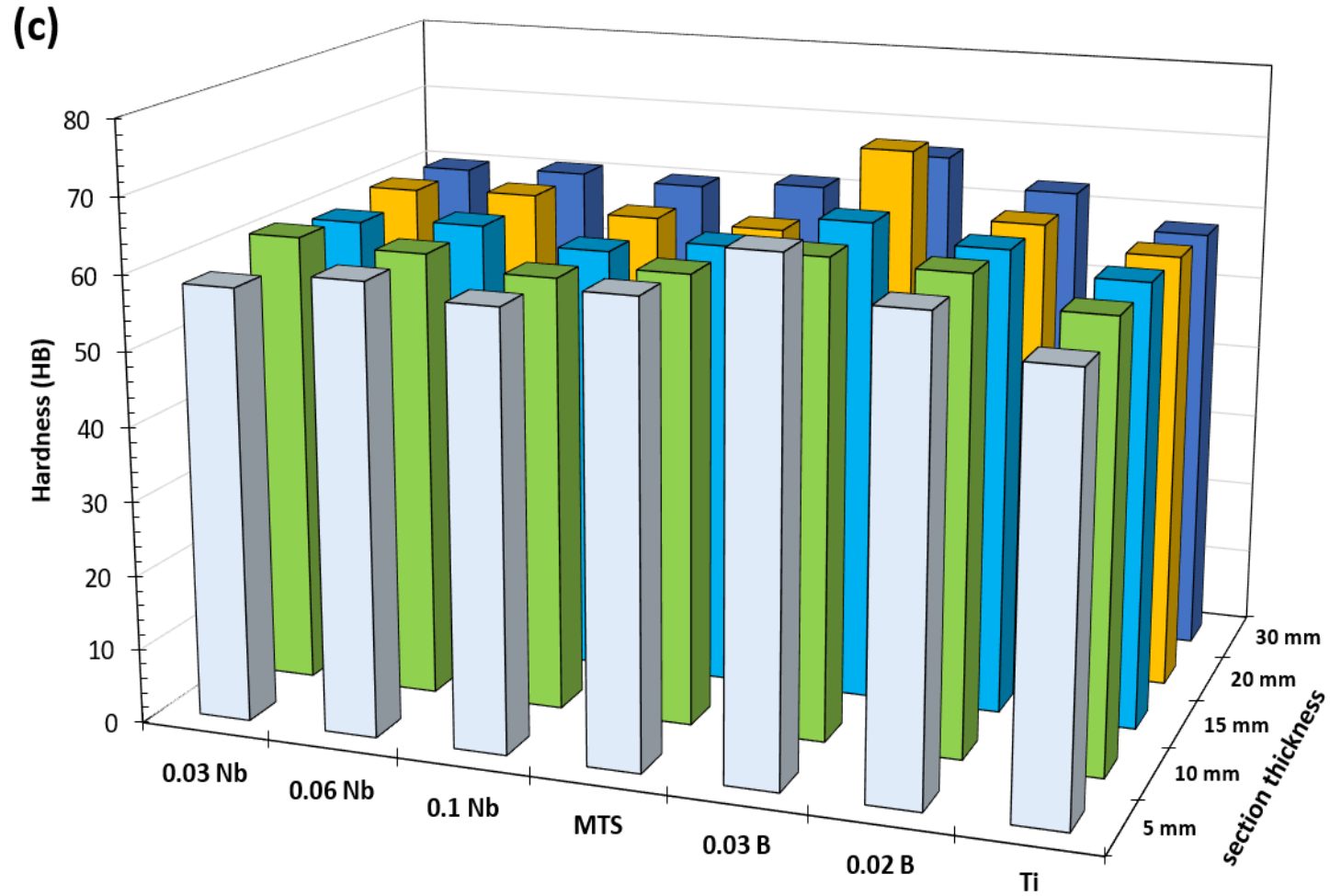


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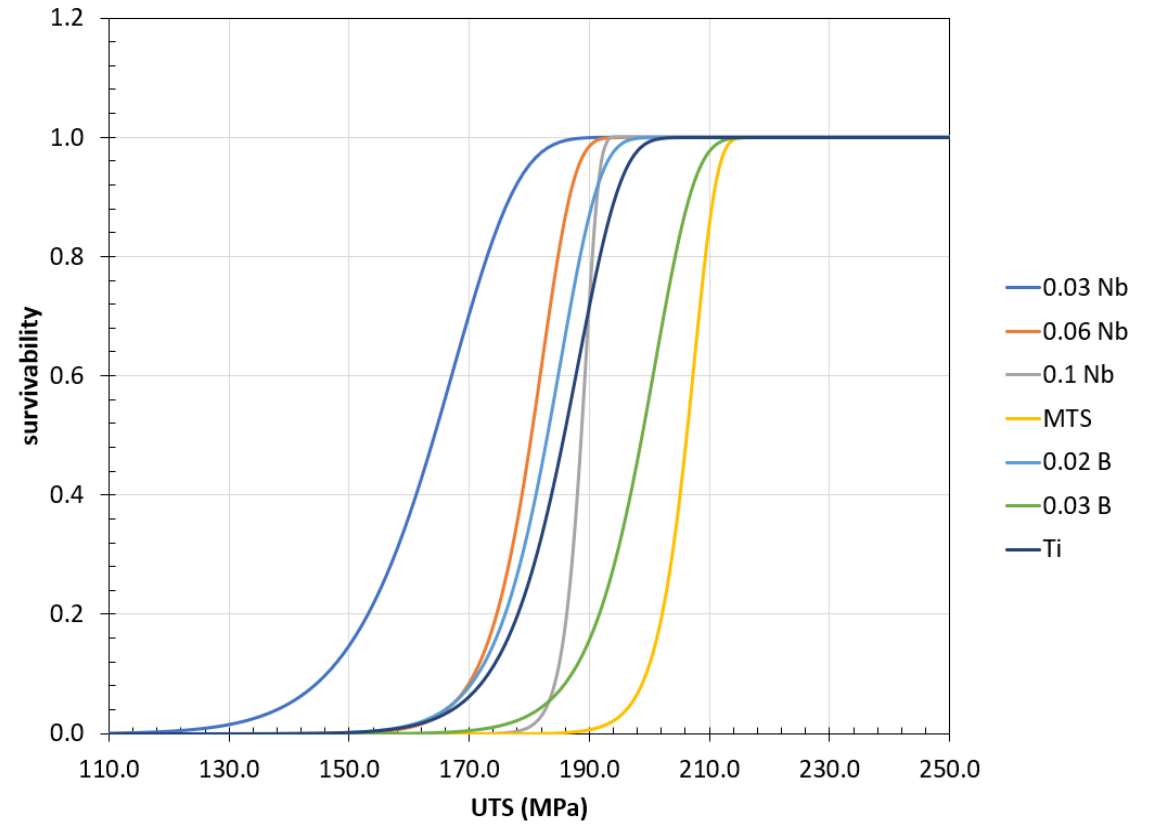
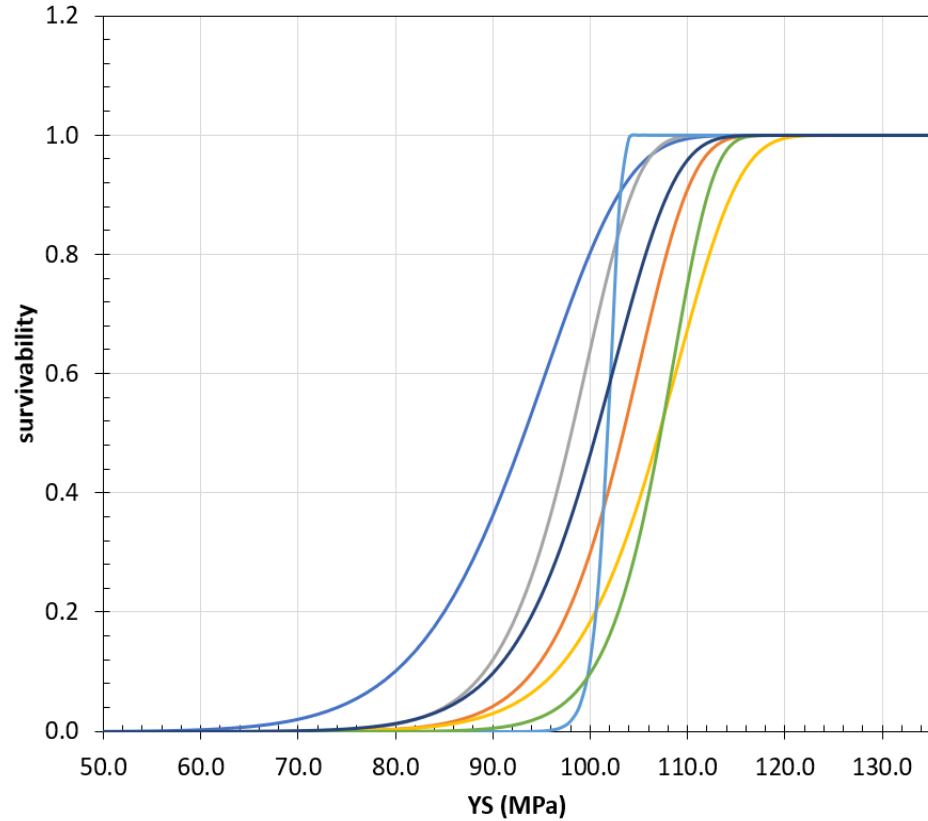


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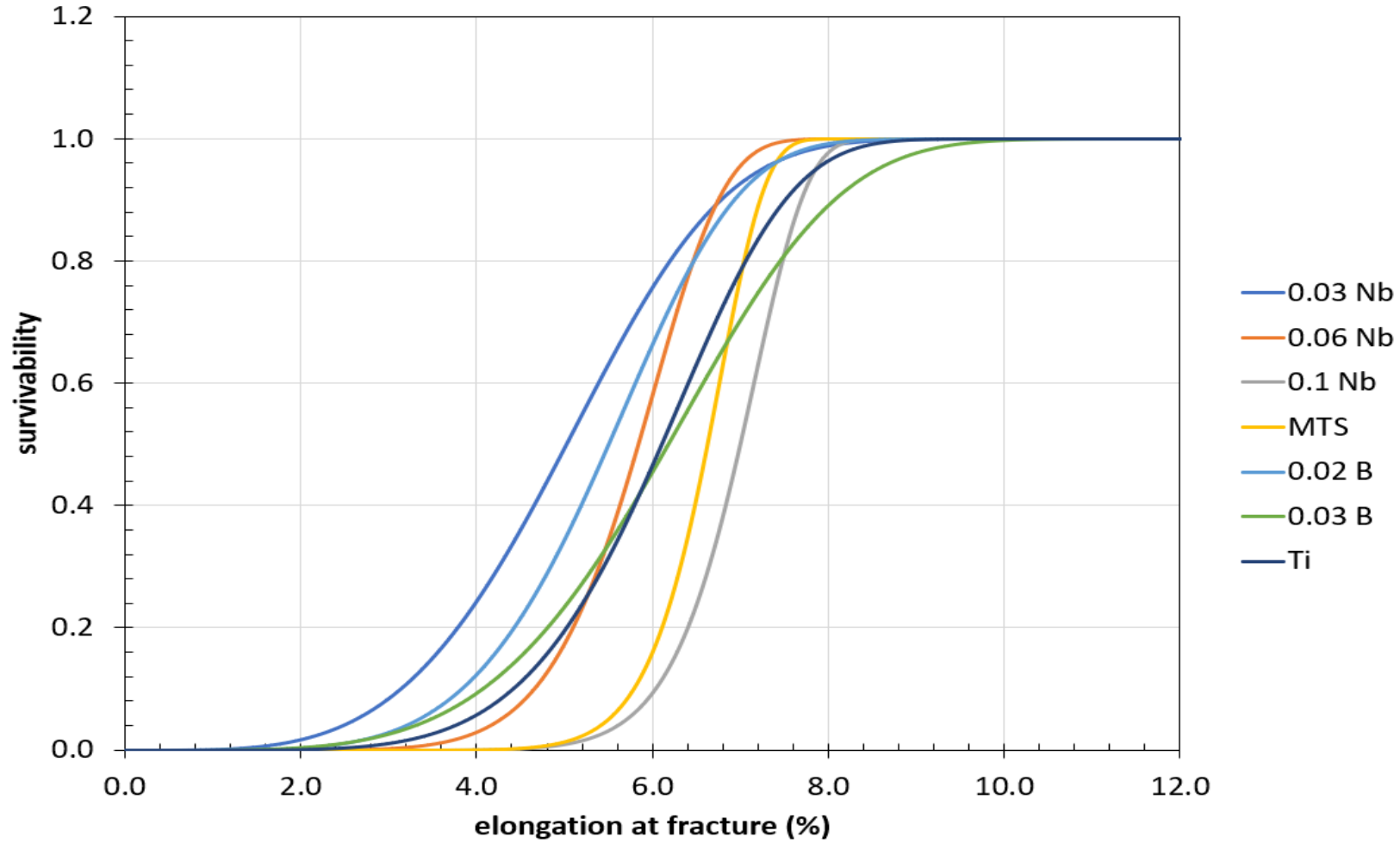


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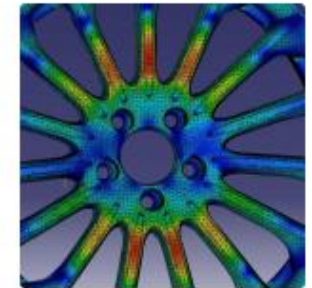
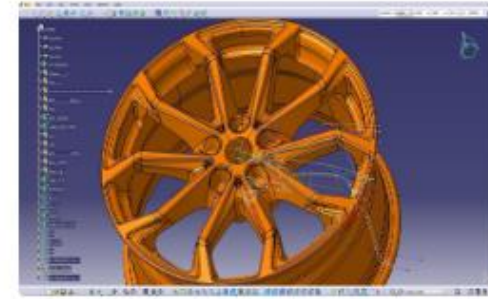
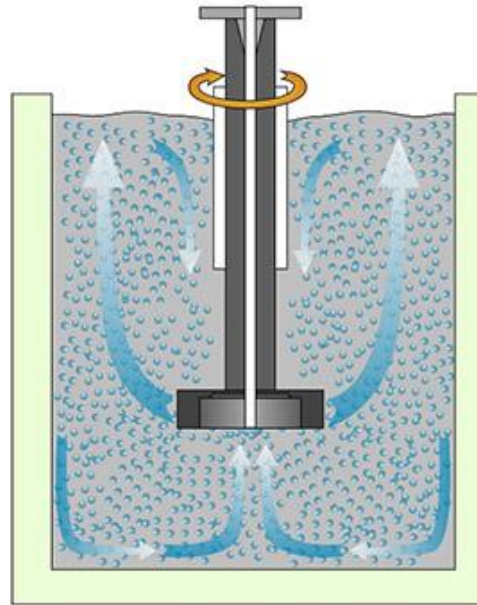
JANT DÖKÜM DENEME PARAMETRELERİ

Si	Fe	Cu	Mn	Mg	Zn	Ni	Sr	Ti
10.794	0.128	0.0031	0.0039	0.140	0.010	0.004	0.037	0.090

- AlTi5B1
- AlNb3B0,5 → 0.1 wt%
- Nucleant 1582 → 450gr

900 kg kapasiteli transfer potası

Tane boyutu analizi için baker test numuneleri jant üzerinden çıkarılmıştır.



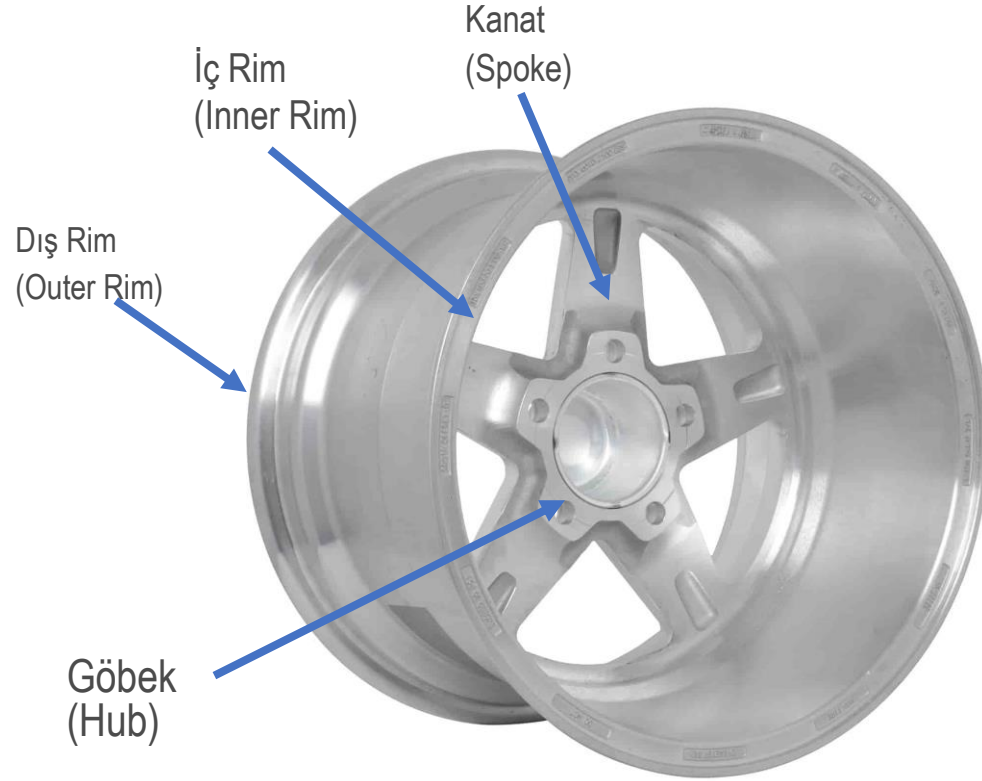


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Tane boyutu ve çekme testleri için numune toplama;

Kanat
İç Rim
Dış Rim
Göbek

Her 5 Jantta 1



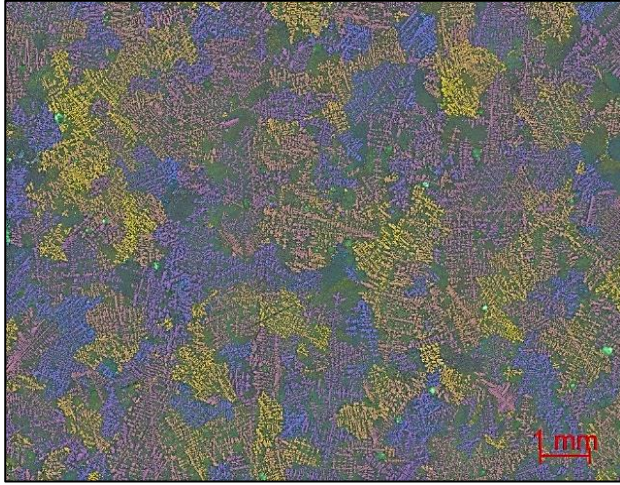


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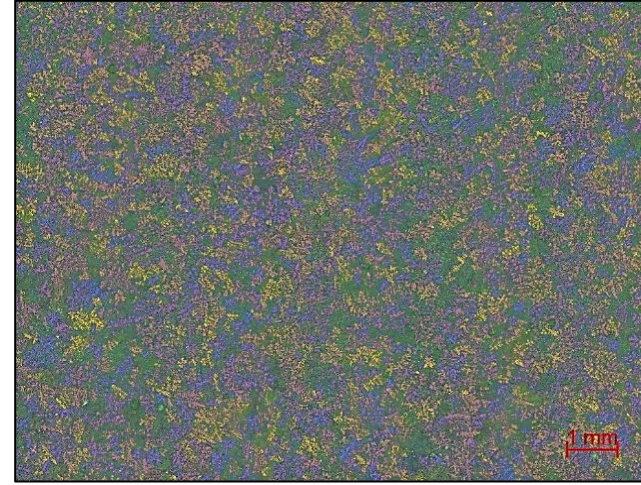
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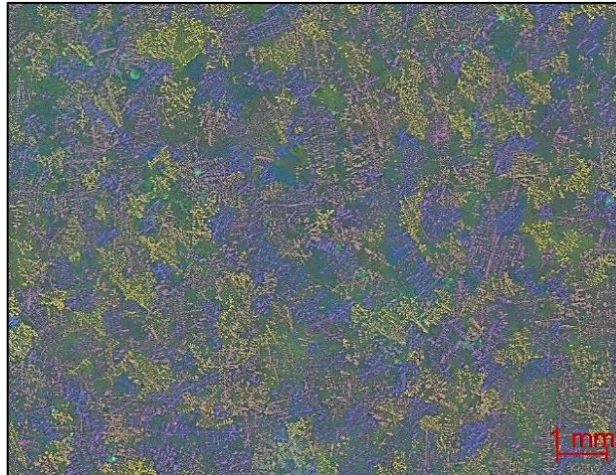
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AlTi5B1



AlNb3B0,5



Nucleant 1582



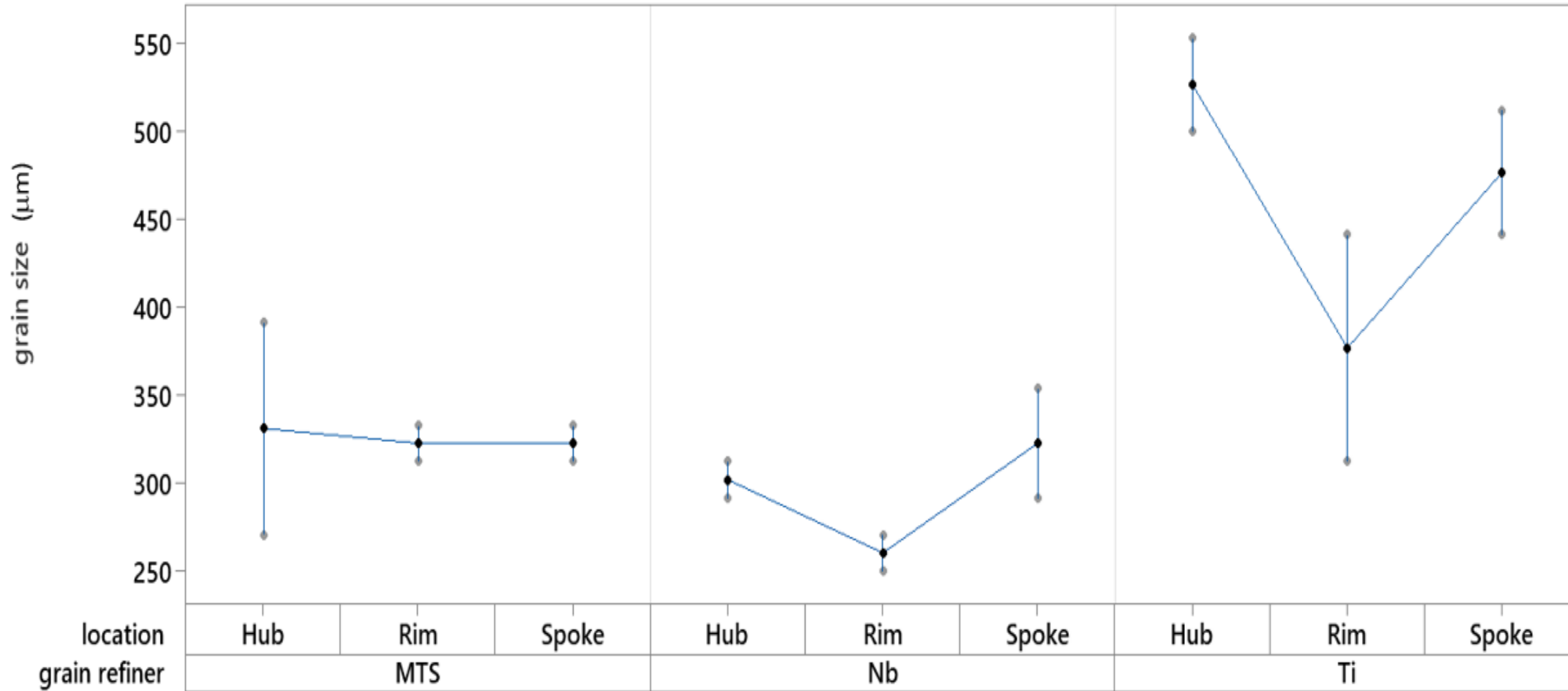


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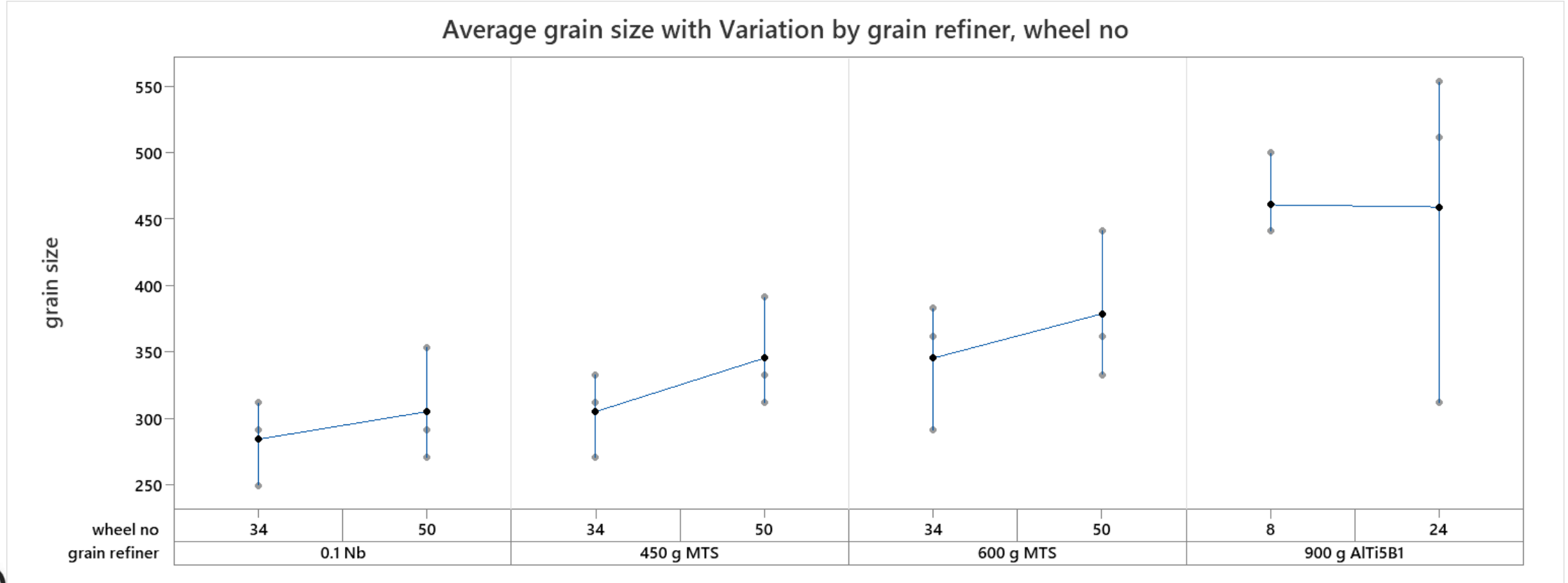


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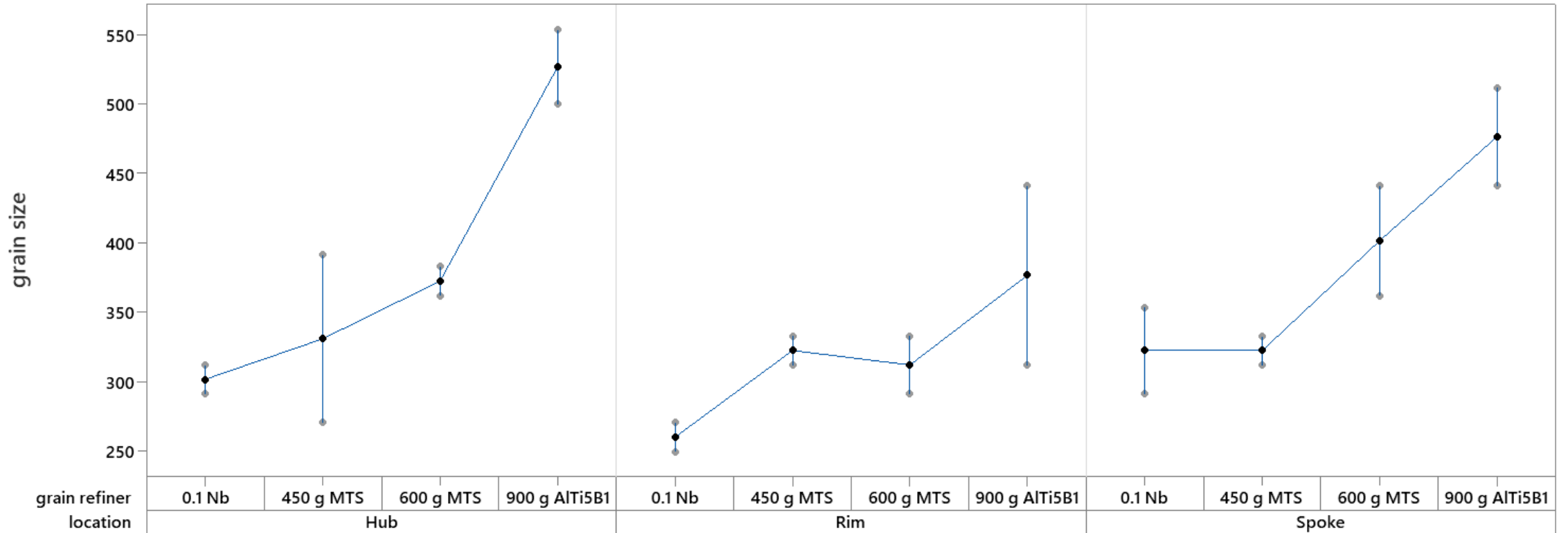
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Average grain size with Variation by location, grain refiner



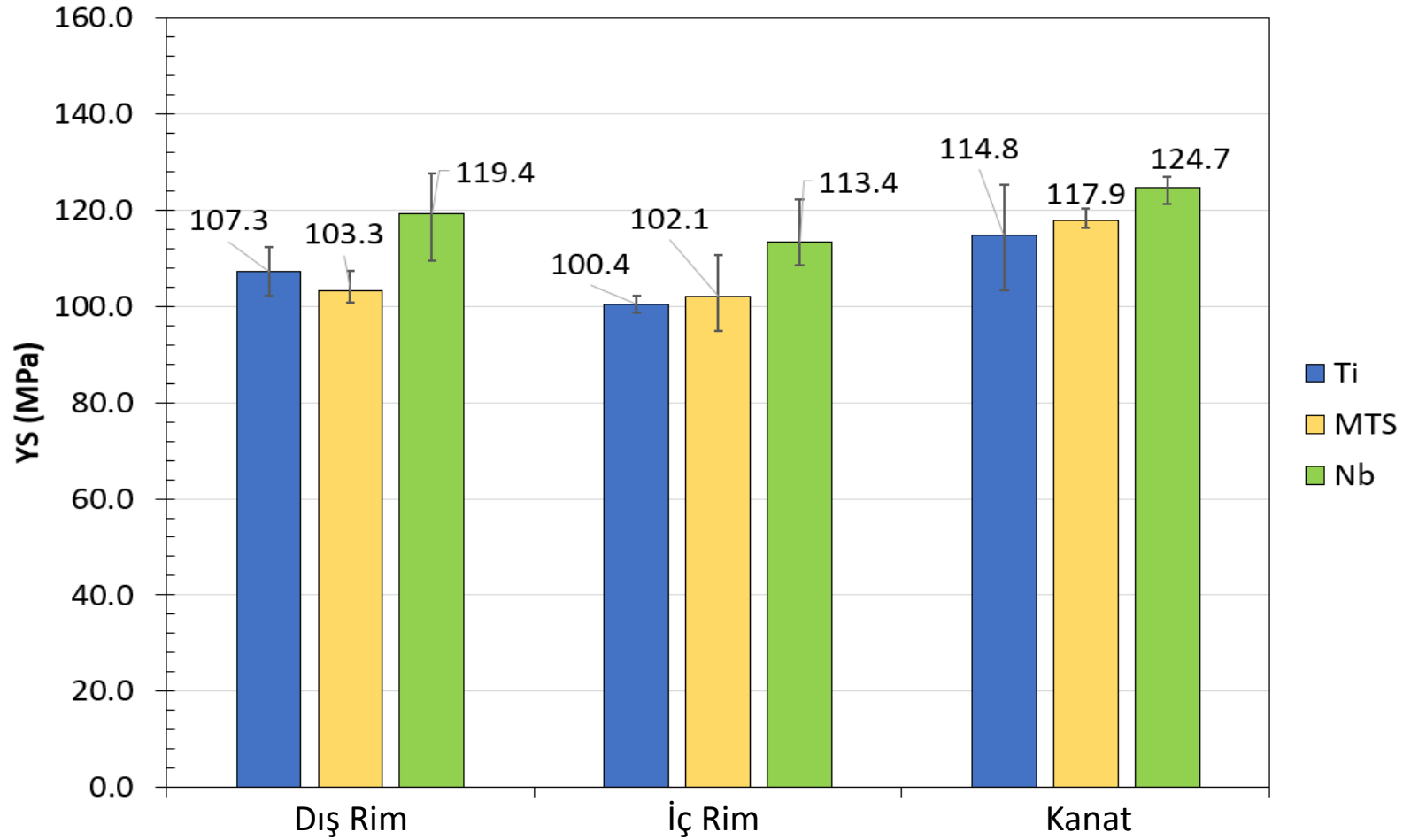


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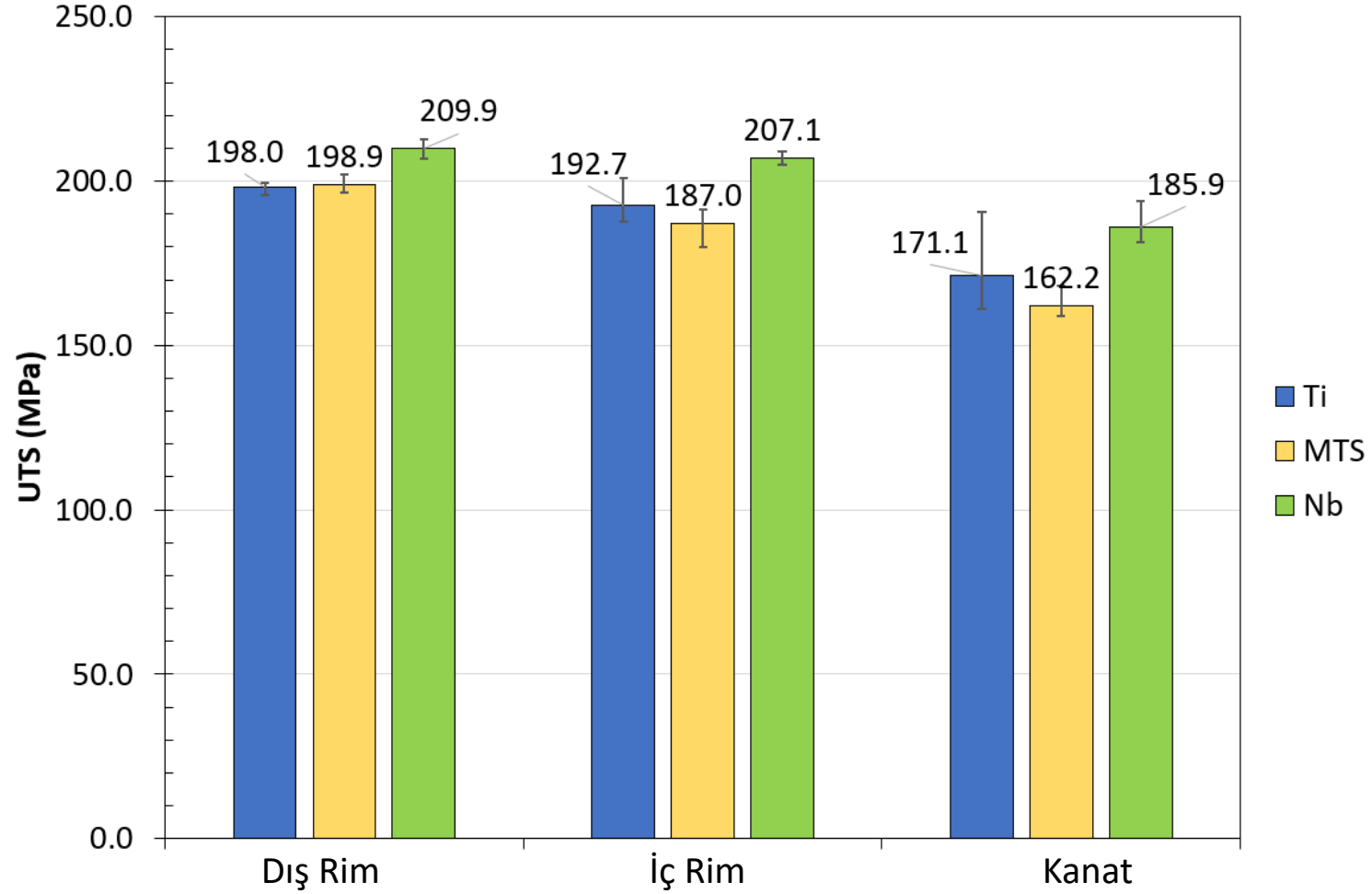


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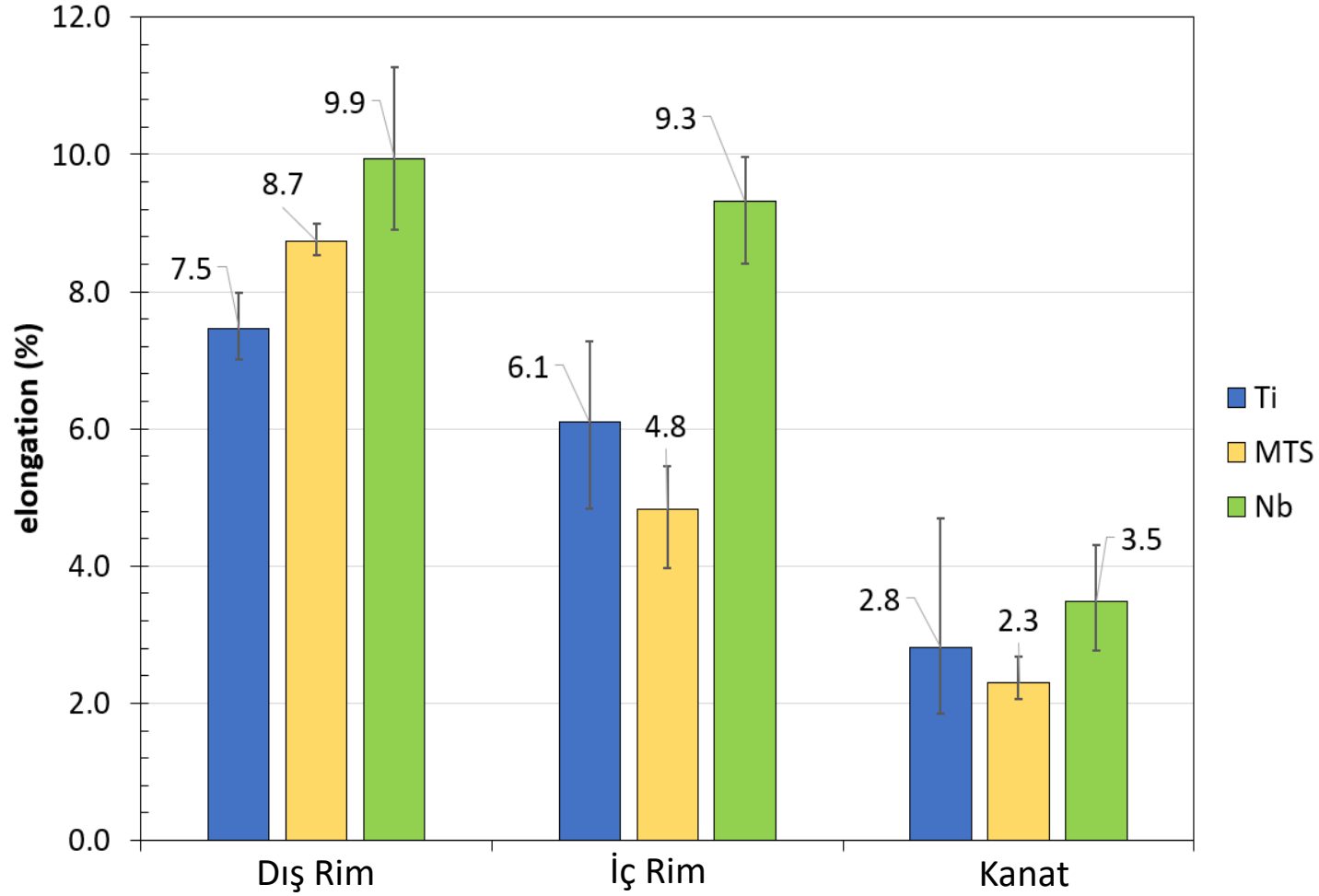


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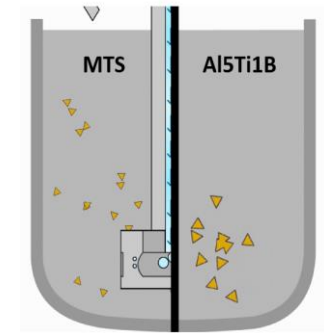
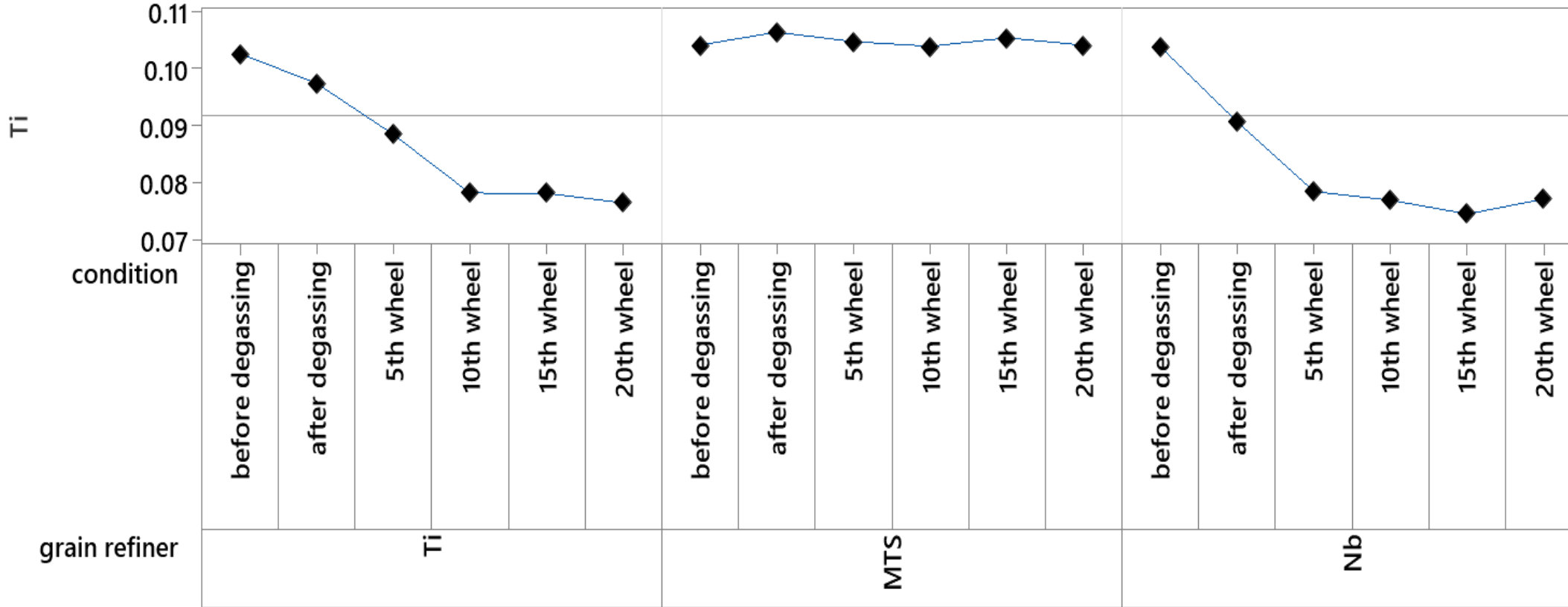


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ÇIKARIMLAR

- AlNb3B0,5 tane inceltici, Al11Si alaşımında en yüksek mekanik özelliklere ve en küçük tane boyutuna sahip mikroyapı üzerinde önemli etkiye sahiptir.
- AlTi5B1 tane incelticinin döküm sonuna doğru verimi azalmaktadır ve tane boyutu dağılımında heterojen mikroyapı ile sonuçlanır.
- Nucleant(MTS) 1582 solma etkisi olmadan hem eriyiğin temizlenmesini hem de tane inceltme işlemini aynı anda sunar.
- Nucleant(MTS) 1582 AlTi5B1'e göre daha küçük tane boyutu ve benzer mekanik özellikler göstermektedir.





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TEŞEKKÜRLER

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