

RECRYSTALLIZATION BEHAVIOR OF NICKEL BASED SUPERALLOY

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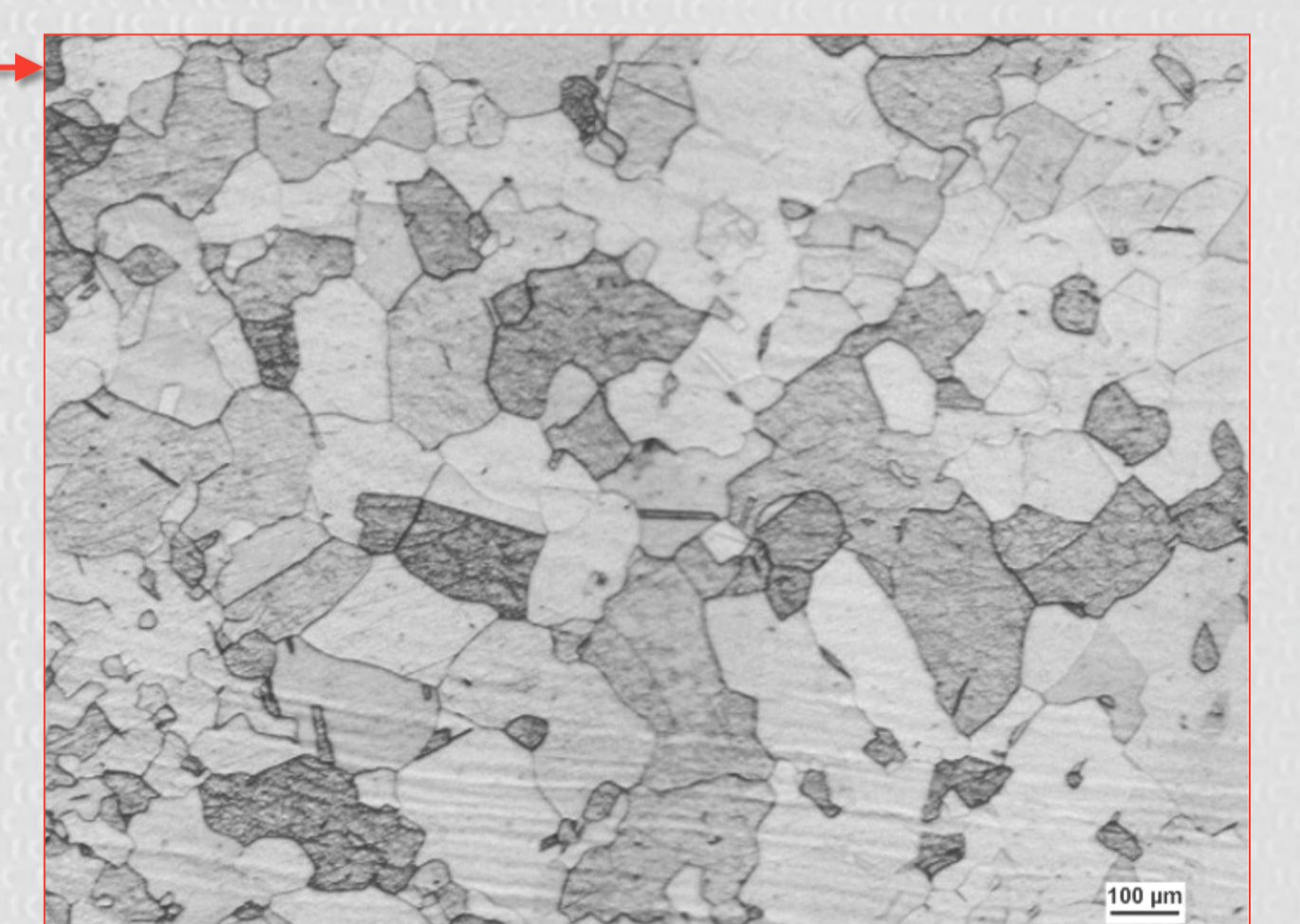
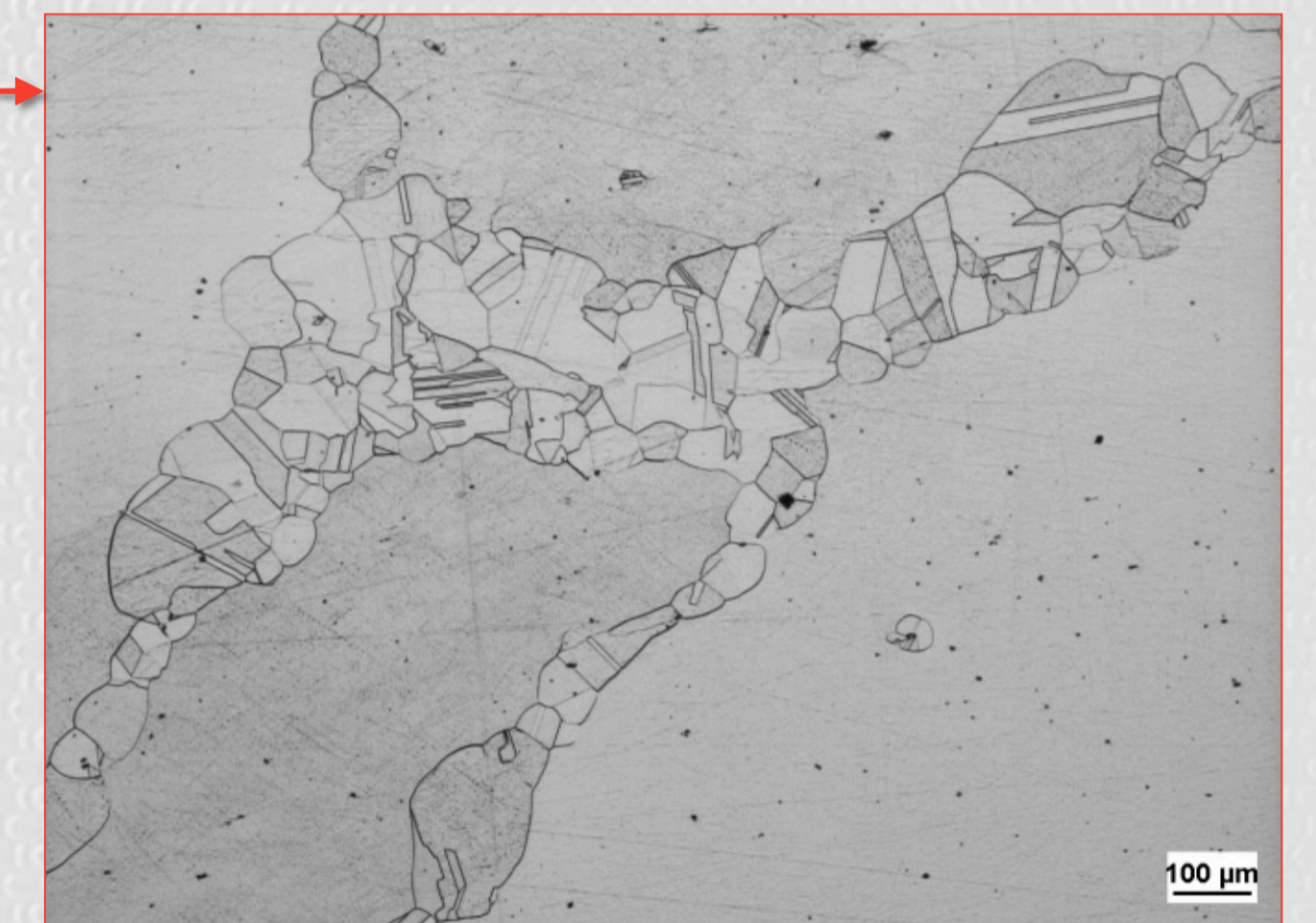
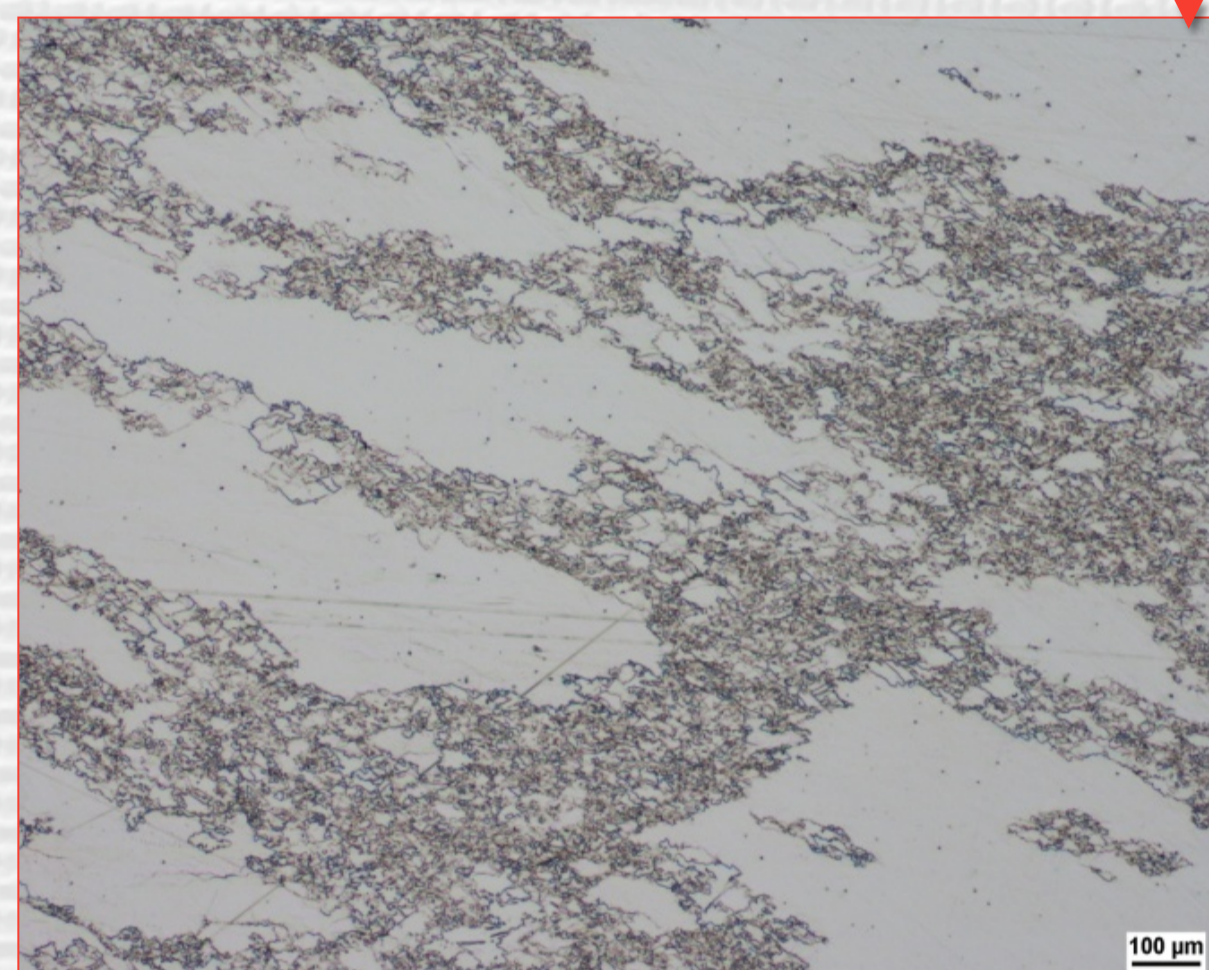
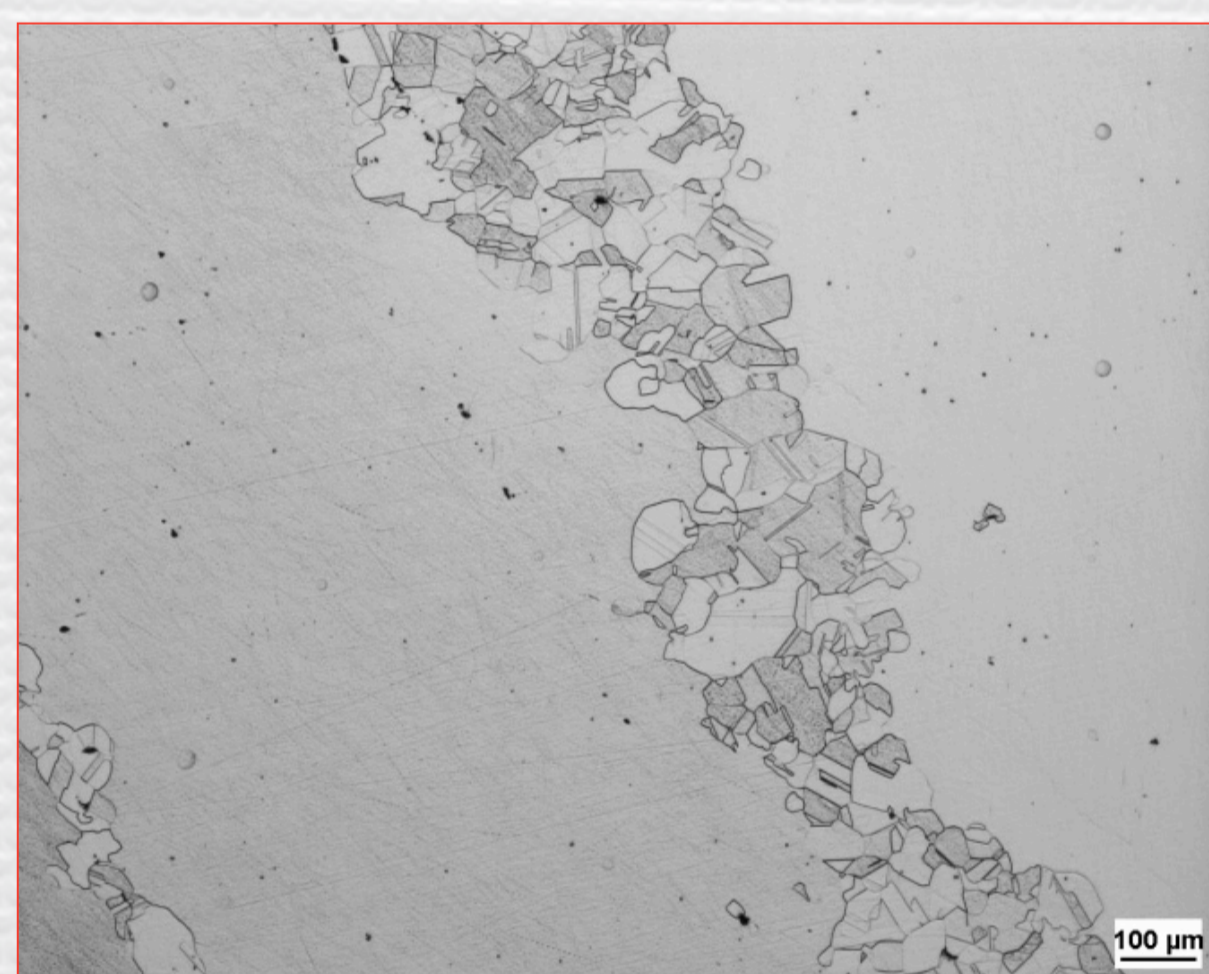
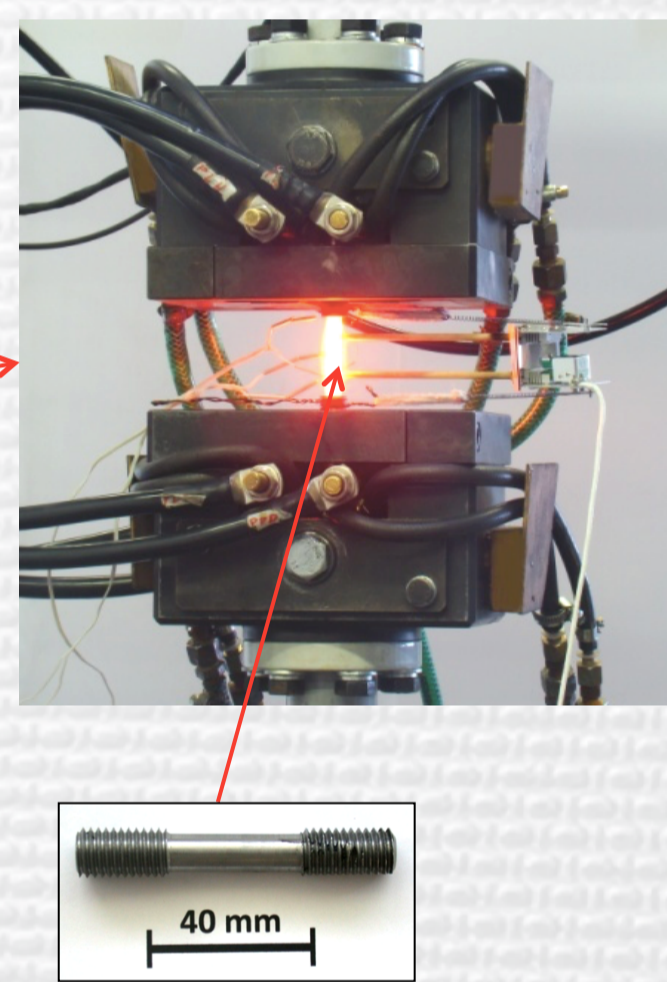
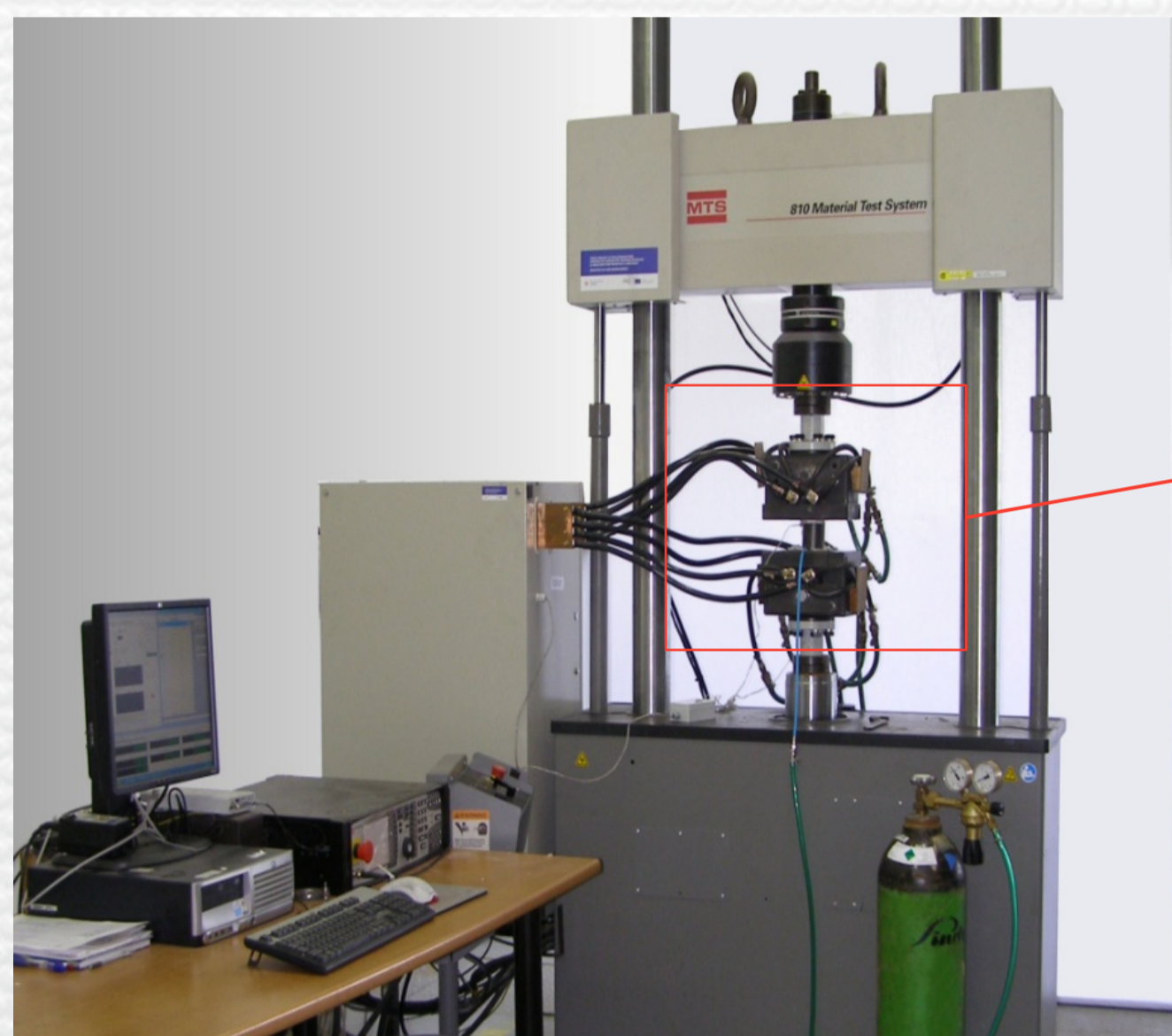
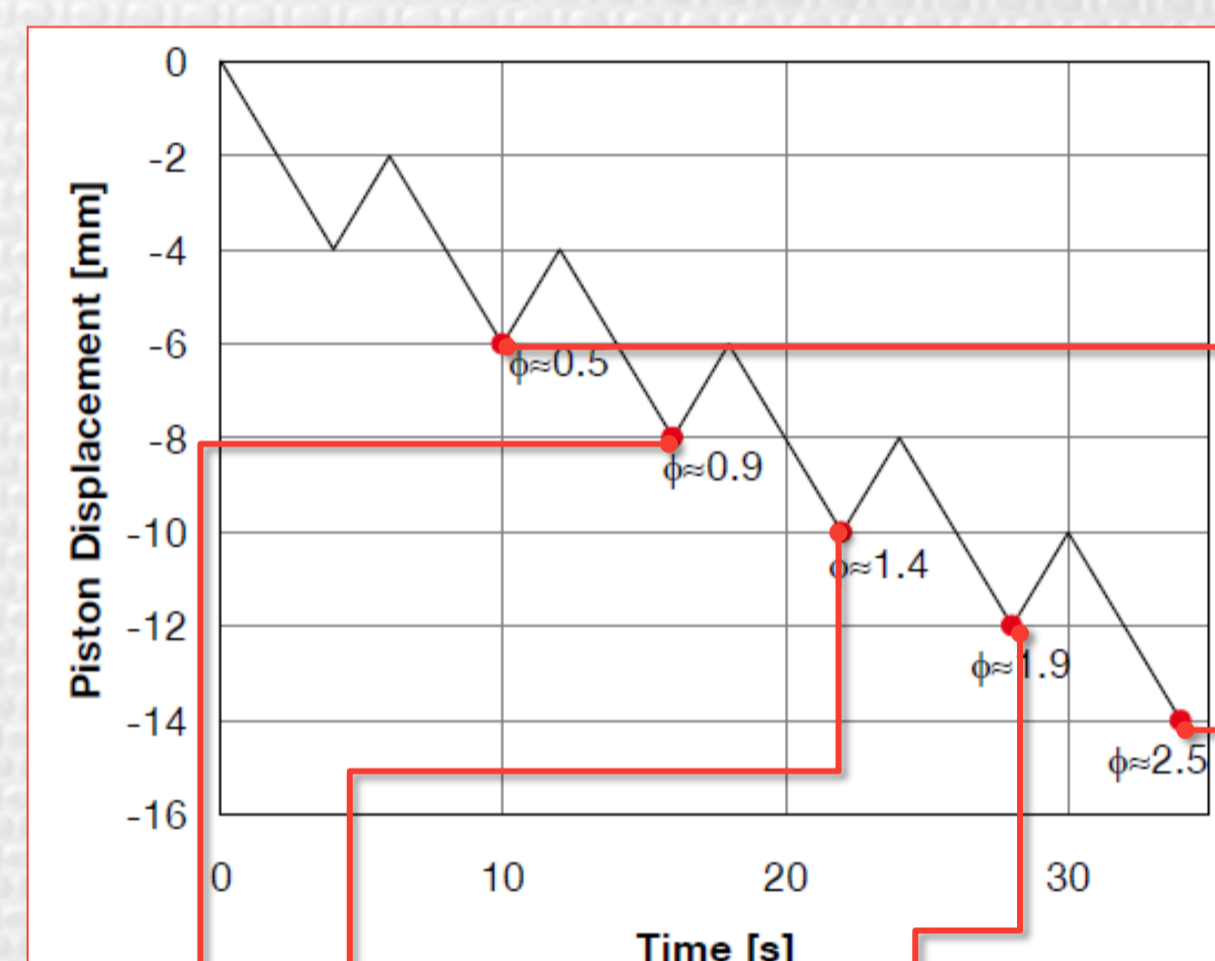
Thermomechanical processing – microstructure evolution

Samples were subjected to loading with cycles of tensile and compression deformation. The amount of deformation was increased in steps. It is evident that increasing of deformation led to increase of recrystallized volume of grains. At lower deformation recrystallization occurs only on the boundaries of casting grains, with higher deformation it extends into the grains

Chemical composition of experimental alloy

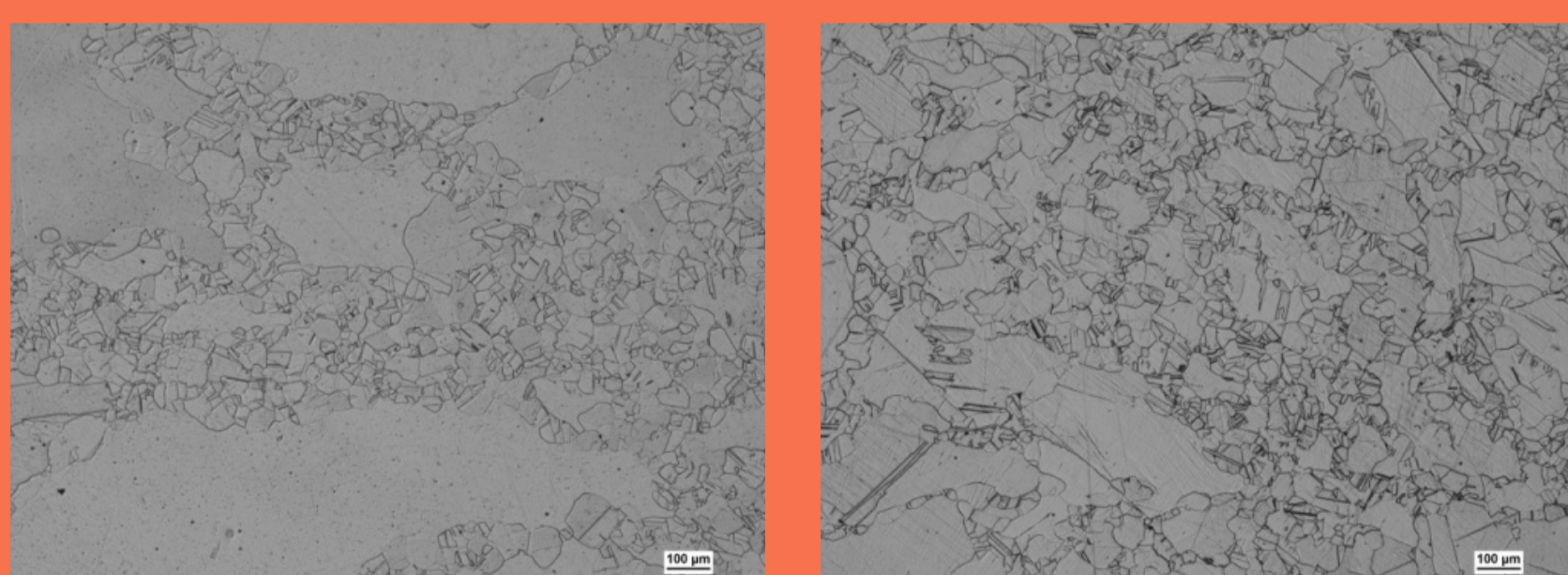
Element	Mo	Cr	Ti	Fe	Mn	Nb	Al	W	Ni
Wt. %	15.81	6.82	0.03	2.32	0.04	0.01	0.26	0.06	base

Deformation cycles applied on particular samples



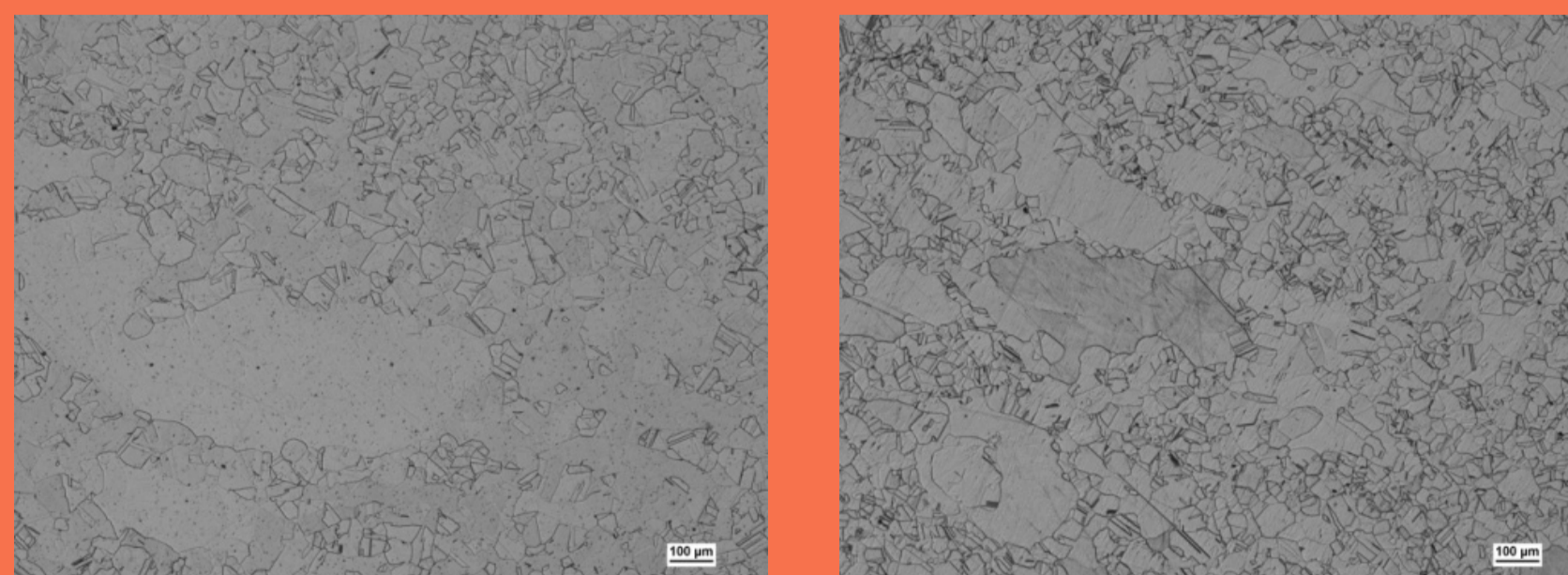
Cold working of samples prior hot deformation

Hot deformation applied: 0,3



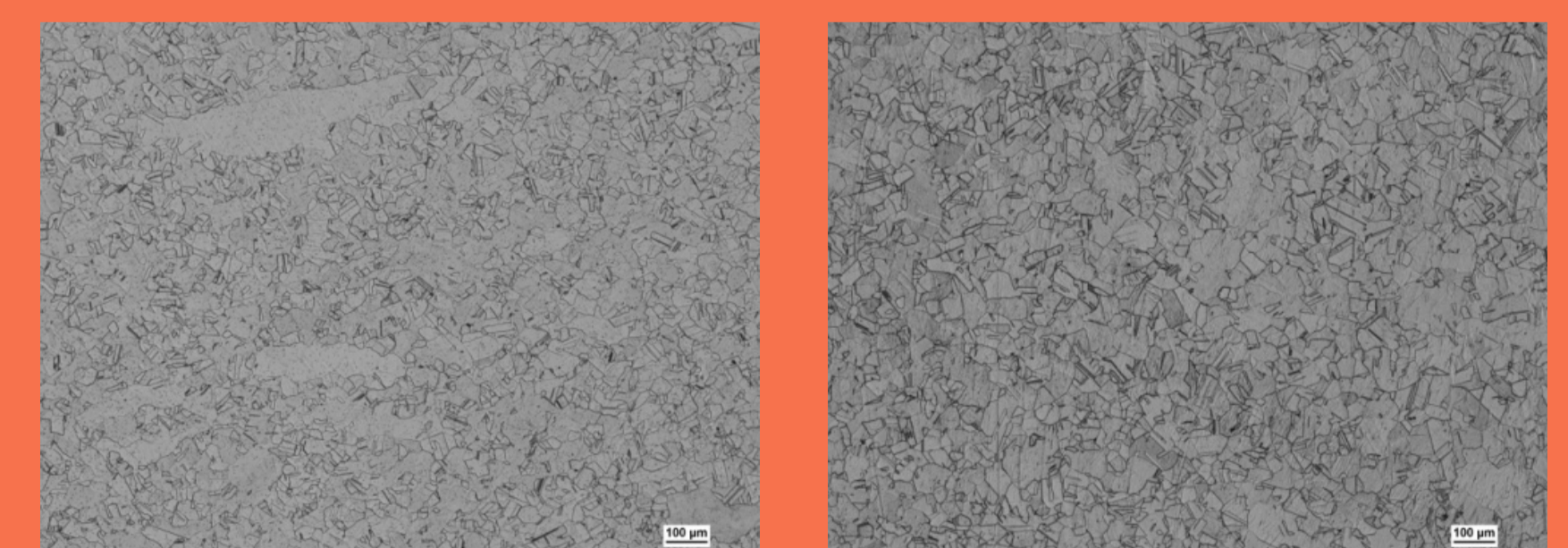
0,05 0,25
Preceding cold deformation

Hot deformation applied: 0,7



0,05 0,25
Preceding cold deformation

Hot deformation applied: 1,1



0,05 0,25
Preceding cold deformation

CONCLUSION

- It was found, that minimal deformation level for starting the recrystallization during the hot working is $\Phi \approx 2.5$. Only such high strain level ensures the recrystallization within the cast grains.
- The recrystallization process is significantly accelerated by preceded cold forming. The structure after cold deformation $\Phi \approx 0.25$ followed by $\Phi \approx 1.1$ hot deformation was perfectly recrystallized.