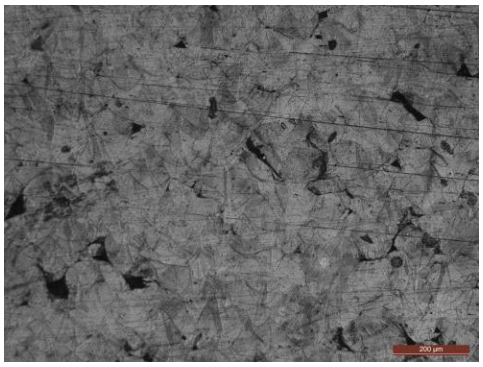
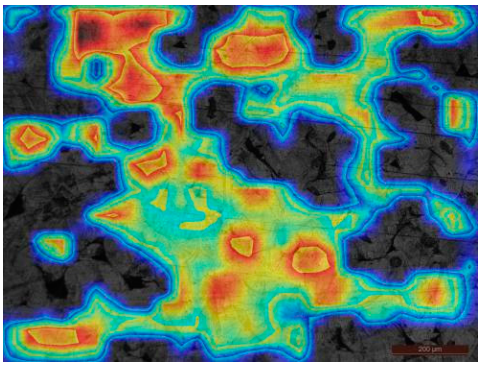
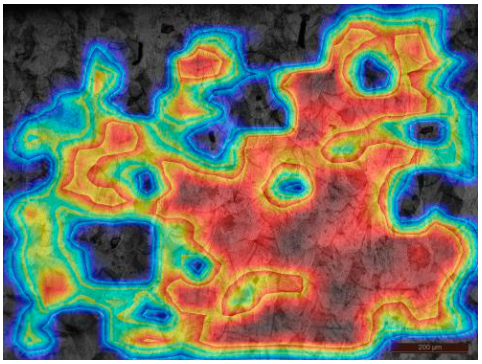
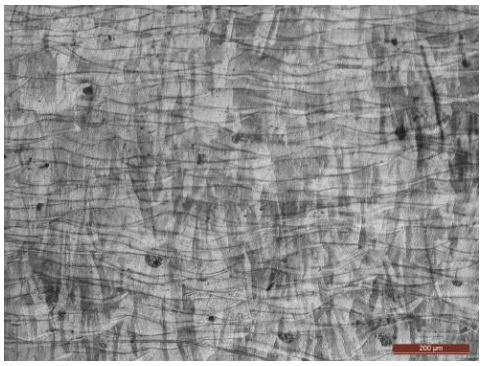
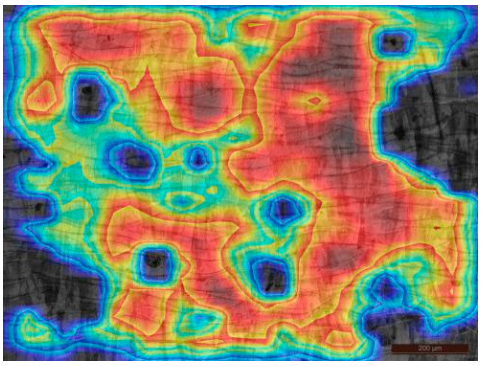
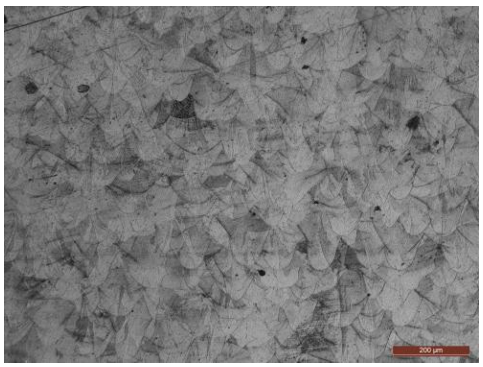
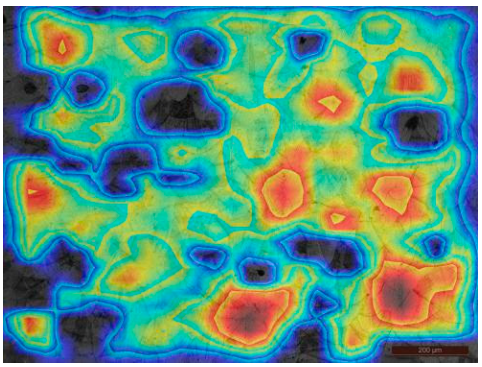
Supplementary Information

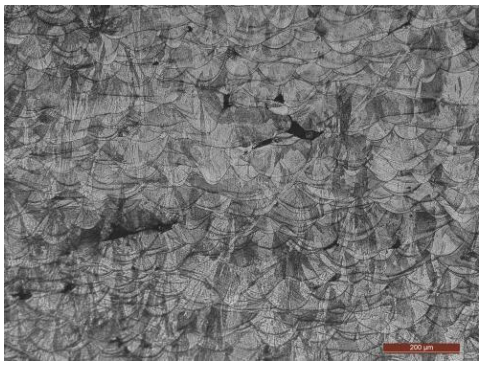
Tensile strength (Mpa)	Input images	Activated features of high strength
688.9		
695.0		
699.9		

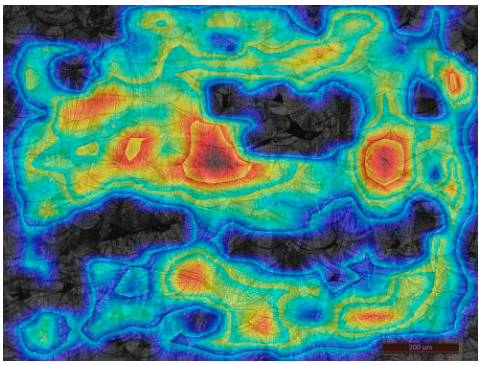
707.1



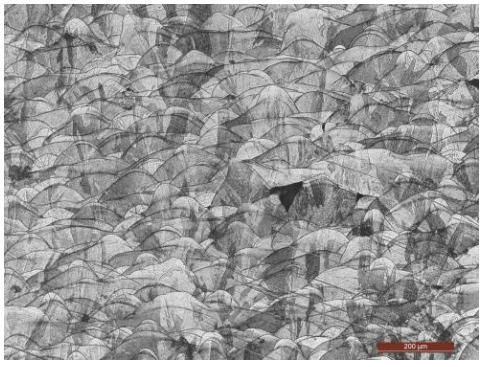


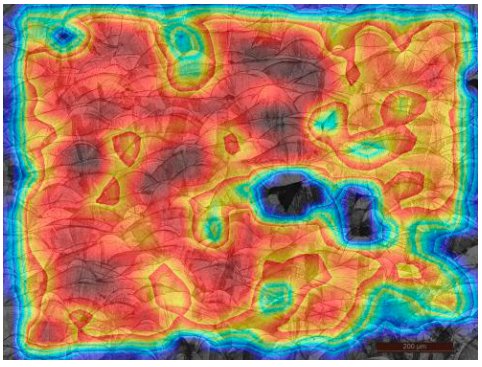
718.8



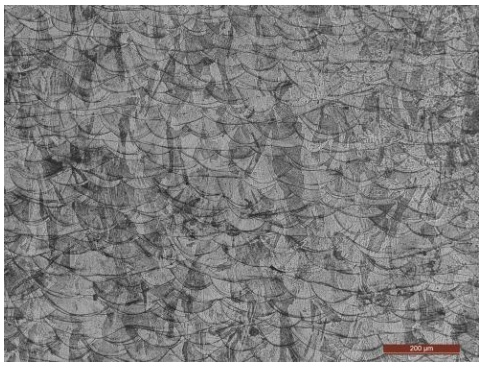


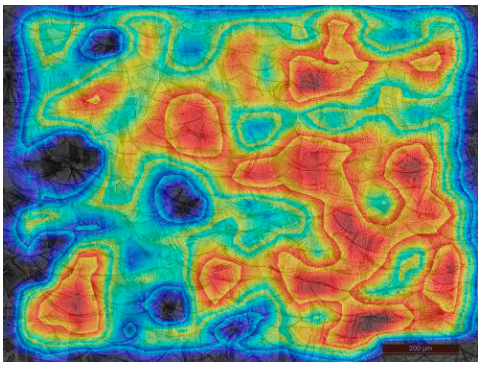
722.1





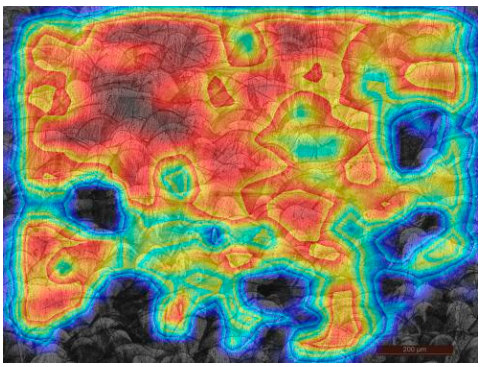
723.5



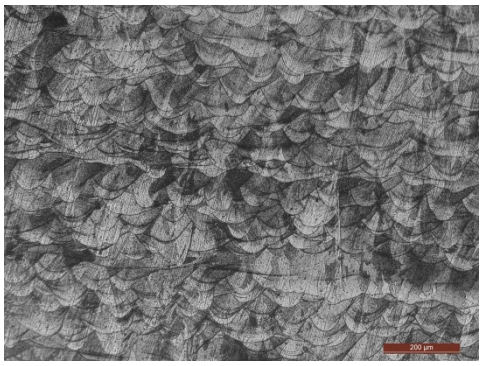


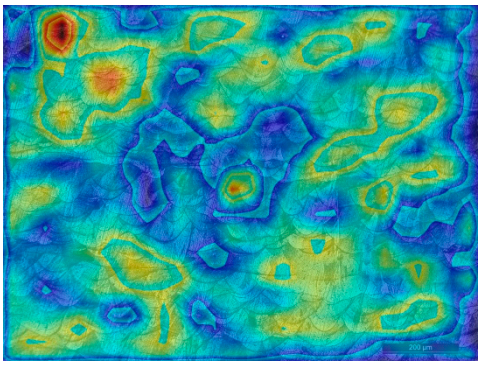
723.8



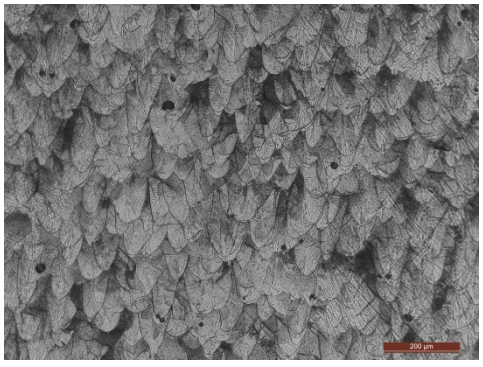


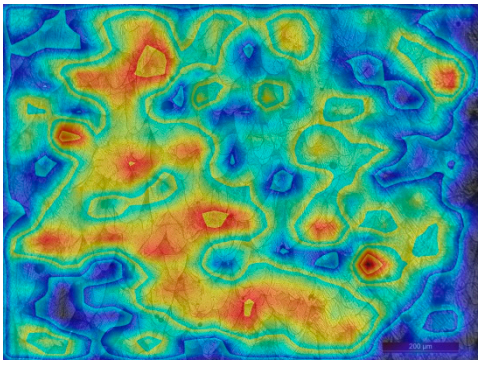
724.0



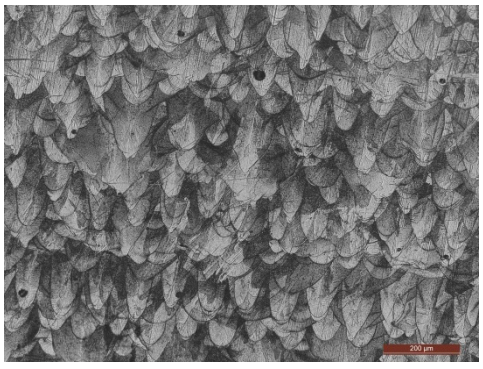


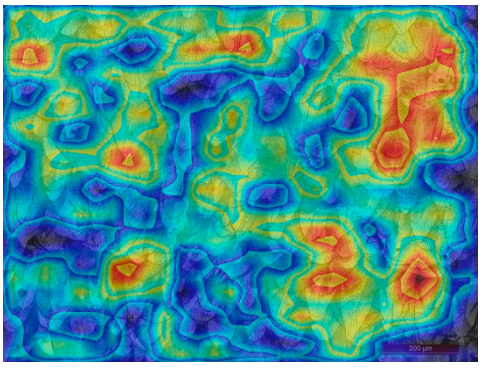
727.7



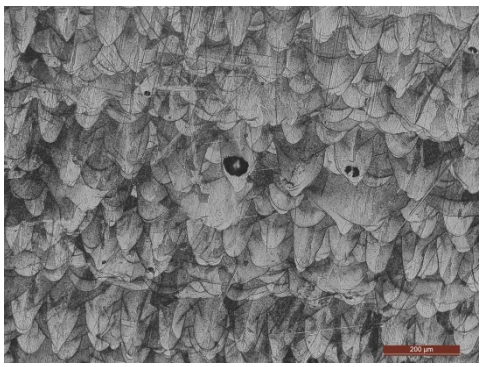


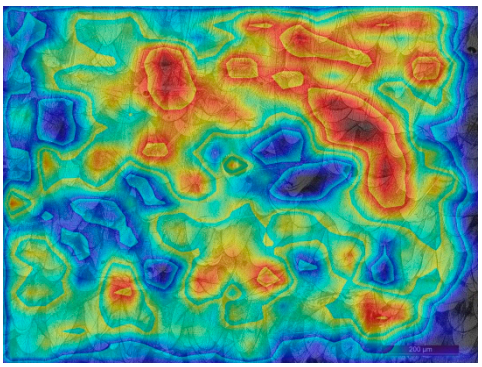
734.1



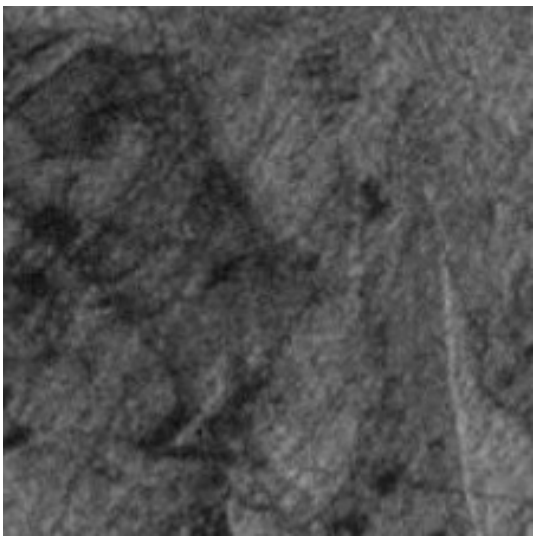


736.7

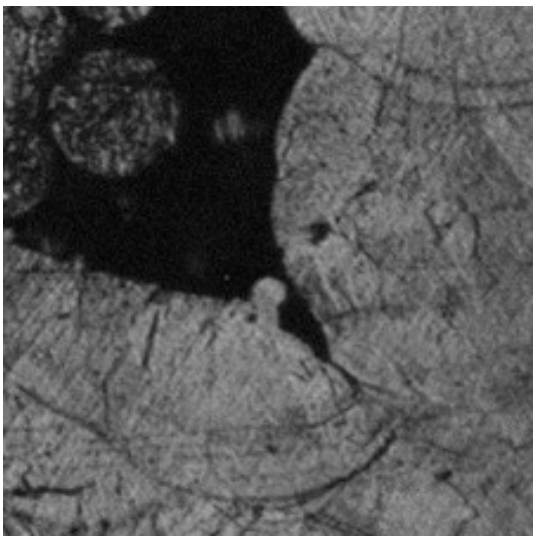




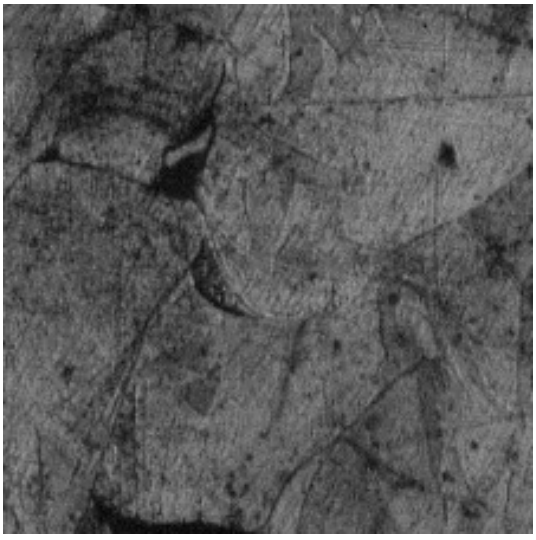
Supplementary Fig. S1 The grade class activate maps were generated by the MPR-NET with its tensile strength labels.



200*200



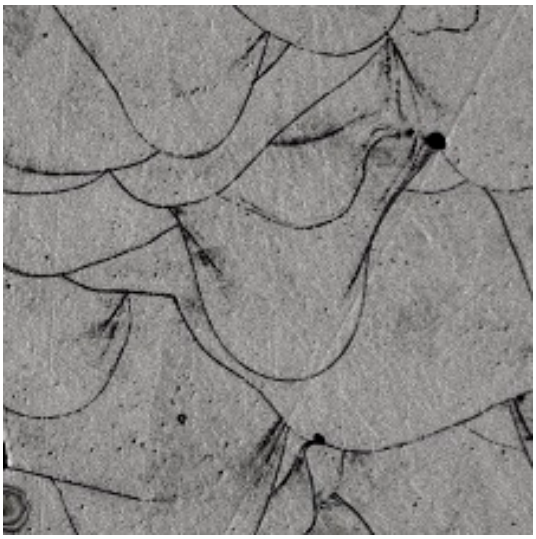
300*300



400*400



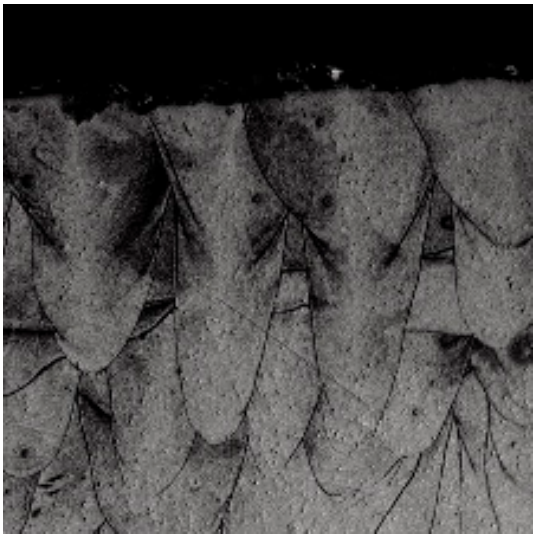
500*500



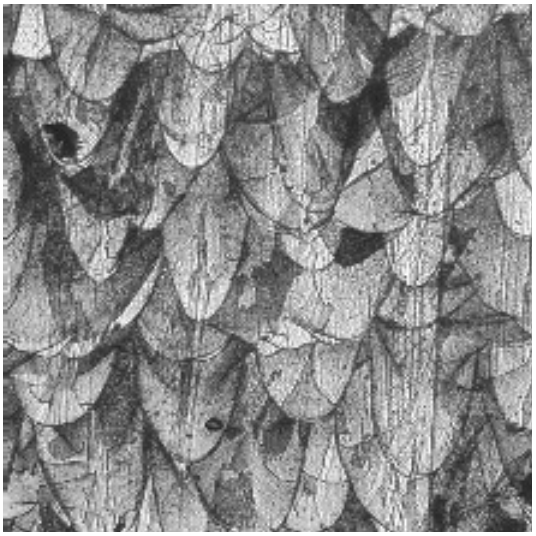
600*600



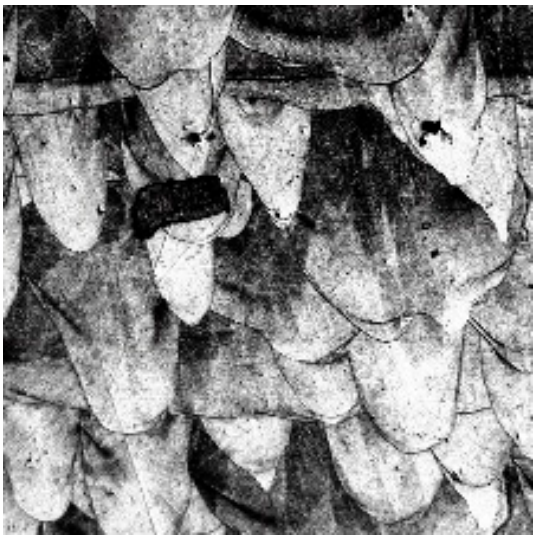
700*700



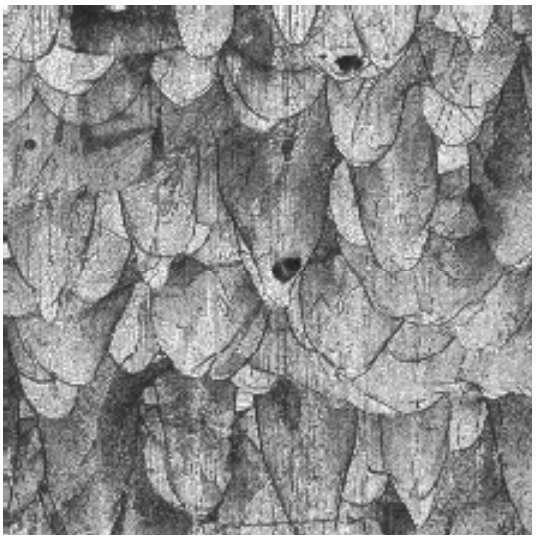
800*800



900*900

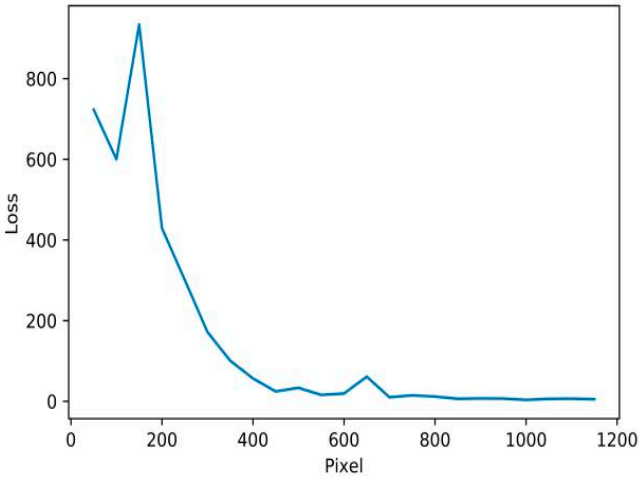


1000*1000

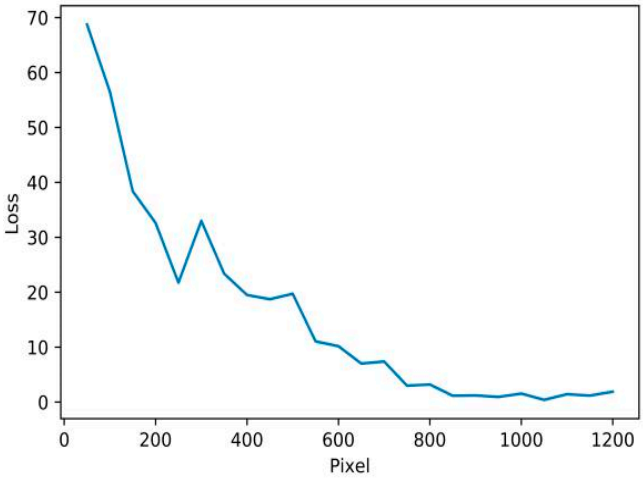


1100*1100

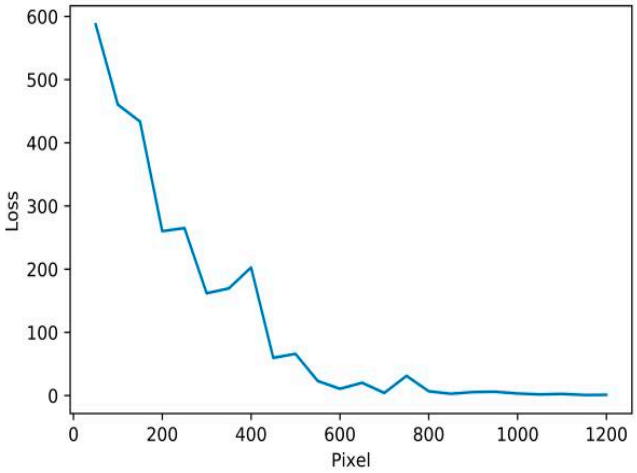
Supplementary Fig. S2 Metallograph images inputs with pixel dimensions ranging from 200 × 200 to 1100 × 1100 for MPR-NET.



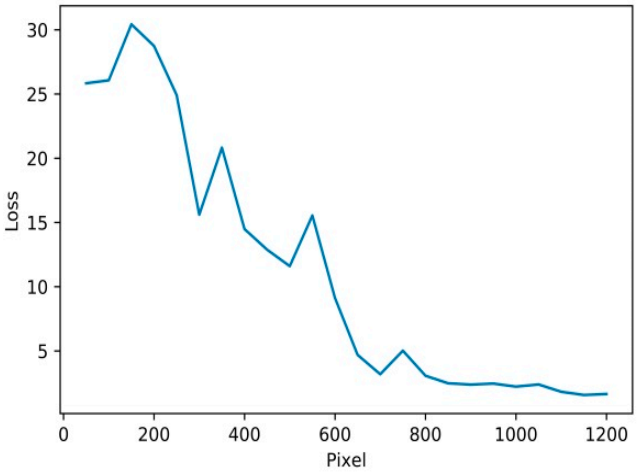
688.88 Mpa



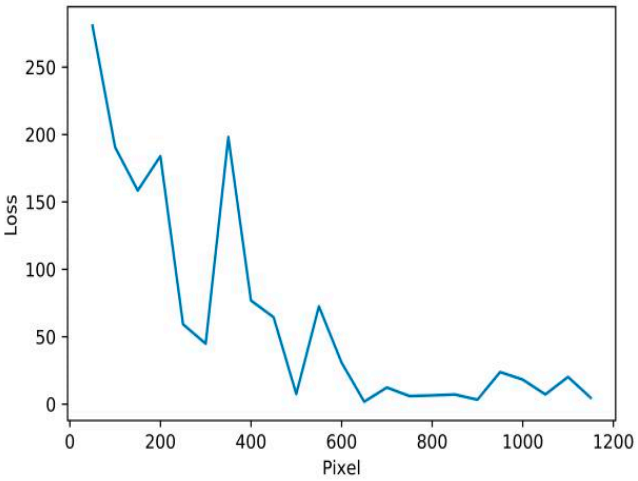
695.0 Mpa



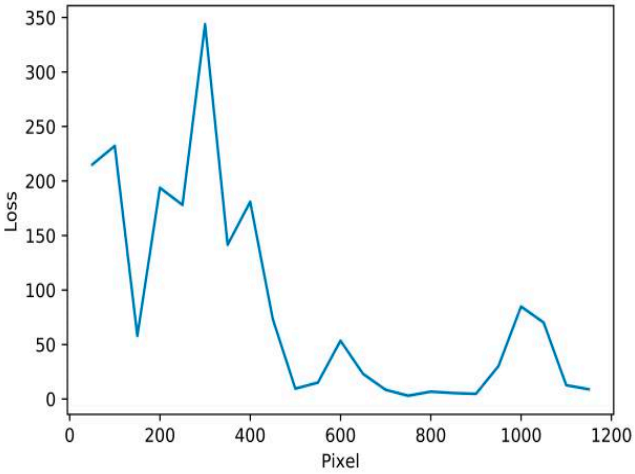
699.88 Mpa



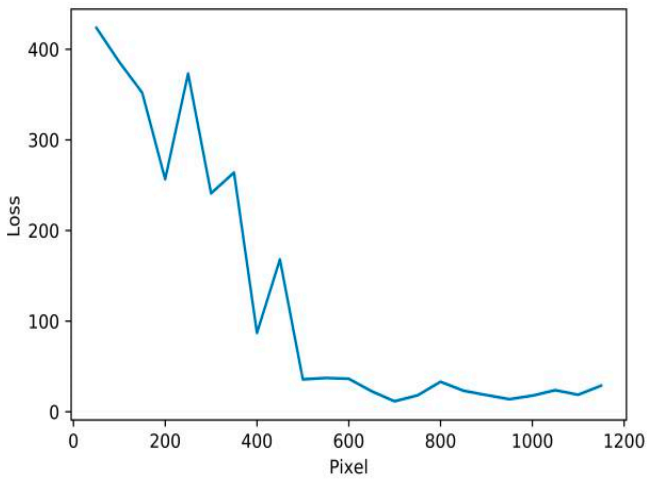
707.1 Mpa



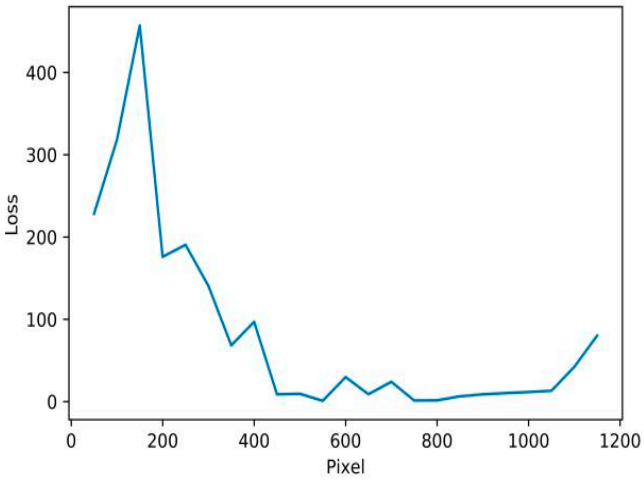
718.8 Mpa



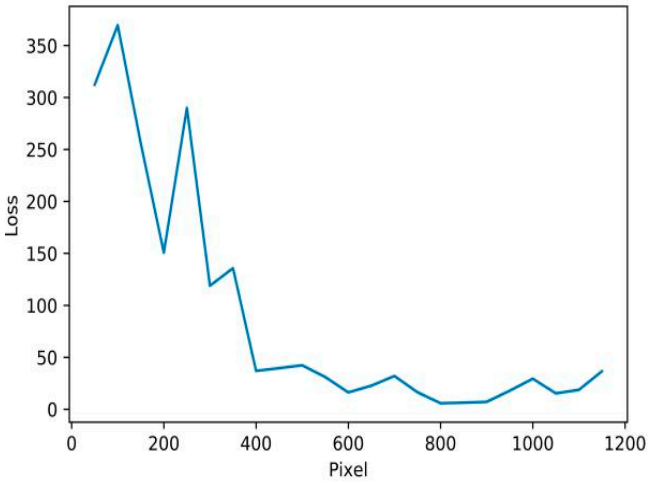
722.1 Mpa



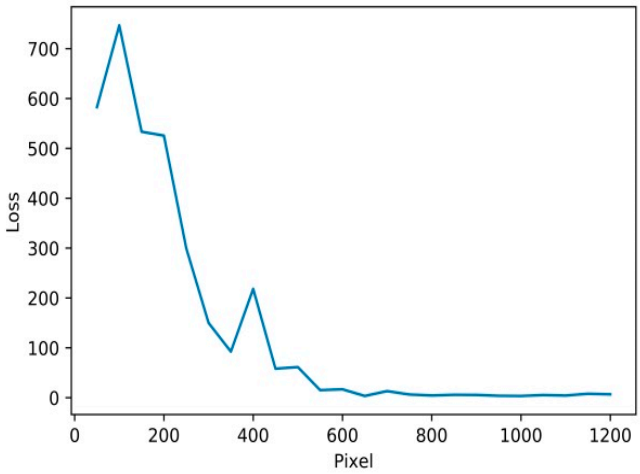
723.5 Mpa



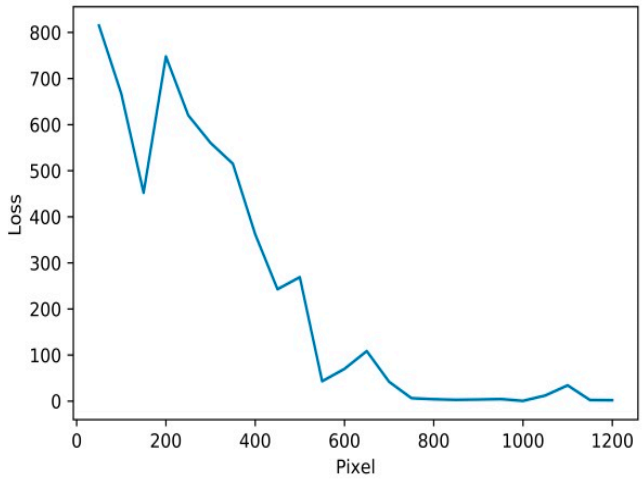
723.8 Mpa



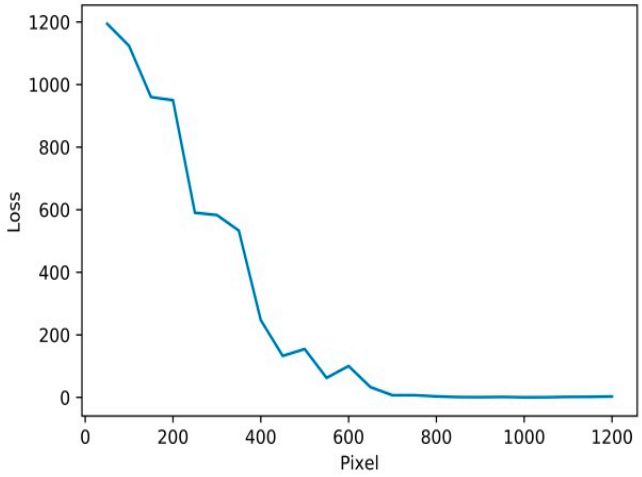
724.0 MPa



727.7 MPa

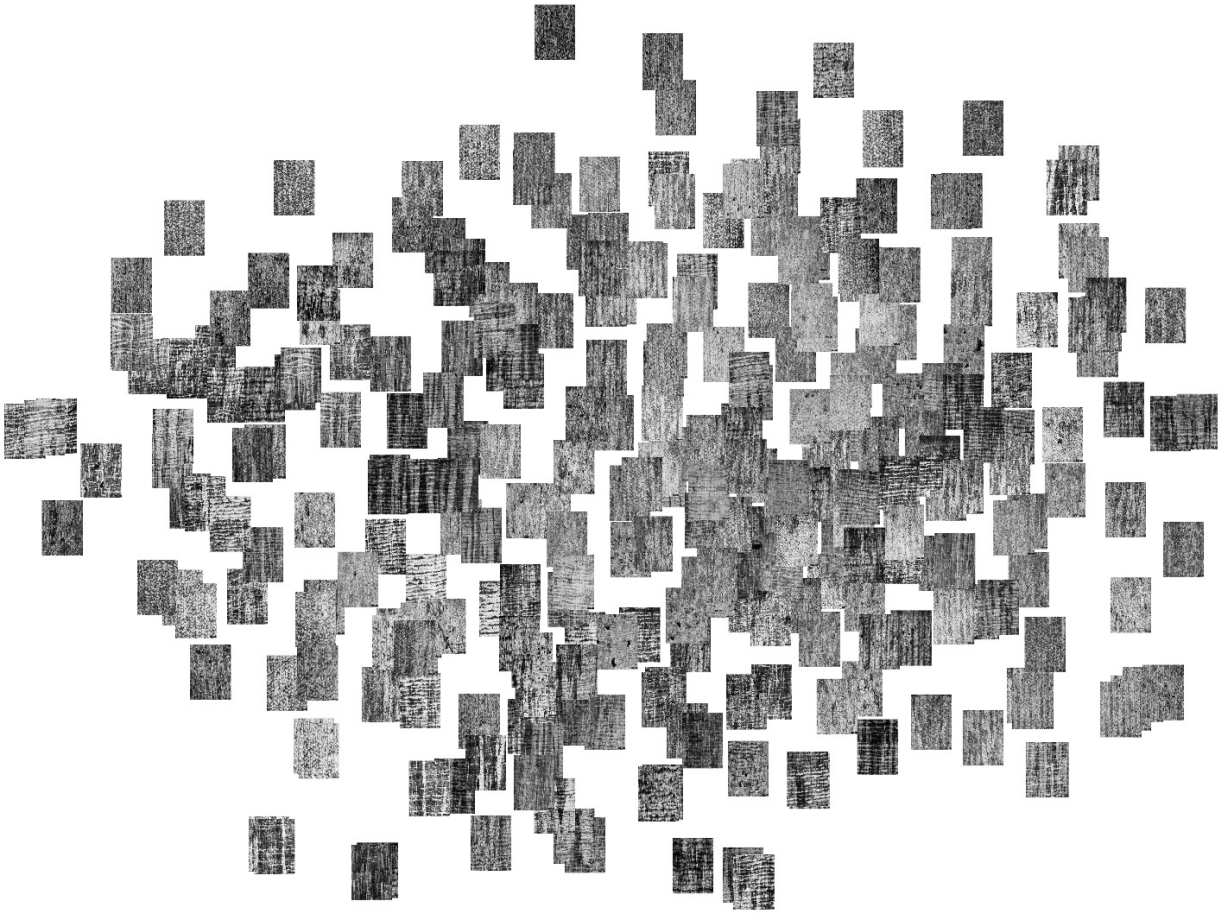


734.1 MPa

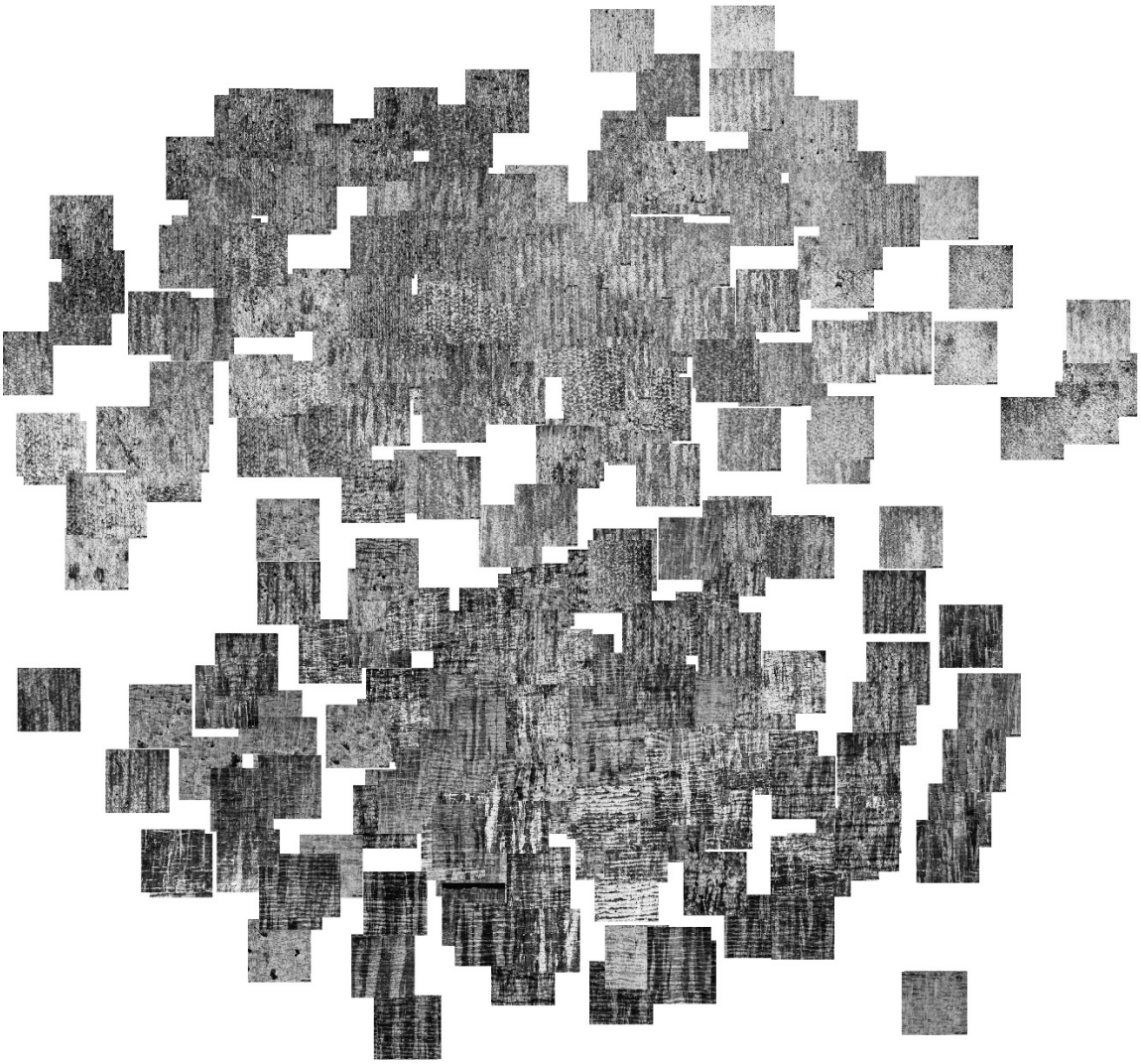


736.7 MPa

Supplementary Fig. S3 The pixel versus mean absolute error (MAE) curve of tensile strength dataset image prediction via the MPR-NET model.



Supplementary Fig. S4 The clustering result of using t-SNE clustering on the images directly.



Supplementary Fig. S5 The t-SNE clustering result by feeding the tensor of the first fully connected layer of the MPR-NET.