鉄と鋼 Tetsu-to-Hagané

Supporting Information

固相窒素吸収法により窒素を導入した 9Cr-1Mo-V-Nb 鋼のクリープ中の組織変化 ―機械学習による STEM-EDS マップの多次元散布図解析―

Microstructure development during creep deformation of 9Cr-1Mo-V-Nb steel with excess nitrogen introduced by solution nitriding – Multidimensional scatter diagram analysis of STEM-EDS maps by machine learning –

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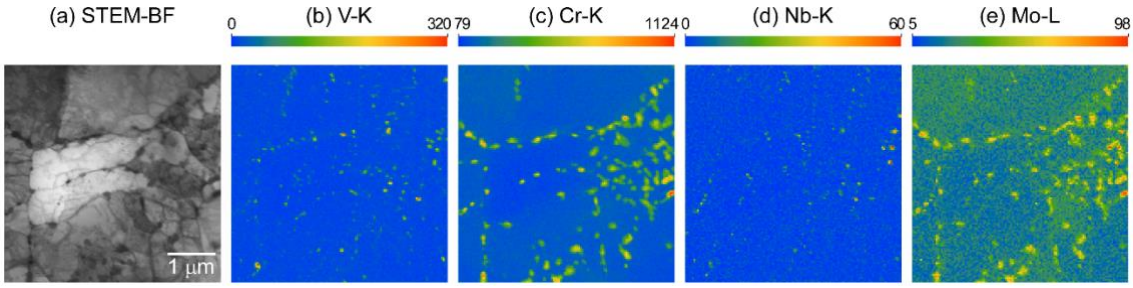

Figure S1 (a) Bright field STEM image and STEM-EDS mapping for (b) V-K, (c) Cr-K, (d) Nb-K, and (e) Mo-L of the as-received T91 (MGD heat). The resolution of the mapping is 128x128 with a pixel size of approximately 35x35 nm^2.

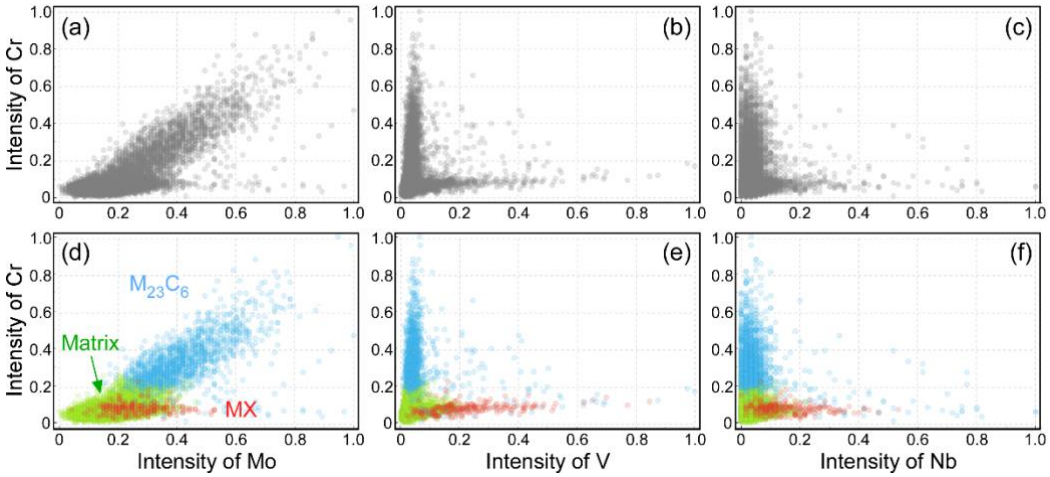

Figure S2 Scatter diagrams of the X-ray intensity of (a) Mo-Cr, (b) V-Cr, (c) Nb-Cr obtained from STEM-EDS maps of the as-received MGD heat and (d)-(f) the results of the clustering.

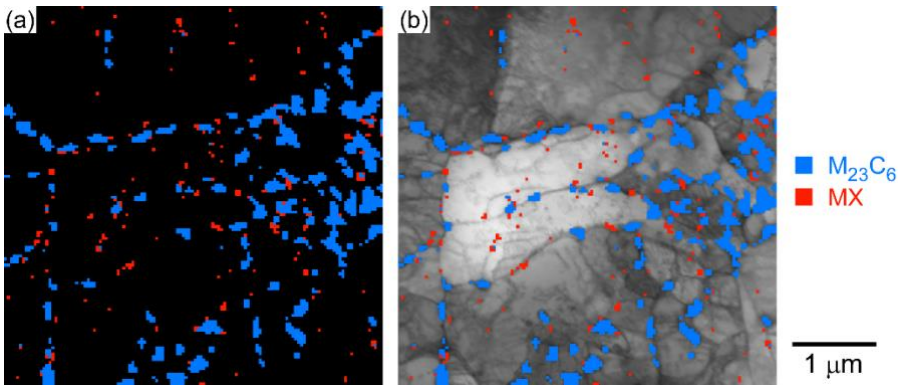

Figure S3 (a) Clustering results of the precipitation behavior of as-received MGD heat and (b) bright field STEM image overlaid on the clustering results. Average diameter of $M_{23}C_6$ and MX was measured to be 120 and 53 nm, respectively. Number density of $M_{23}C_6$ and MX was measured to be 5.4 and 6.2 μm^{-2}, respectively.