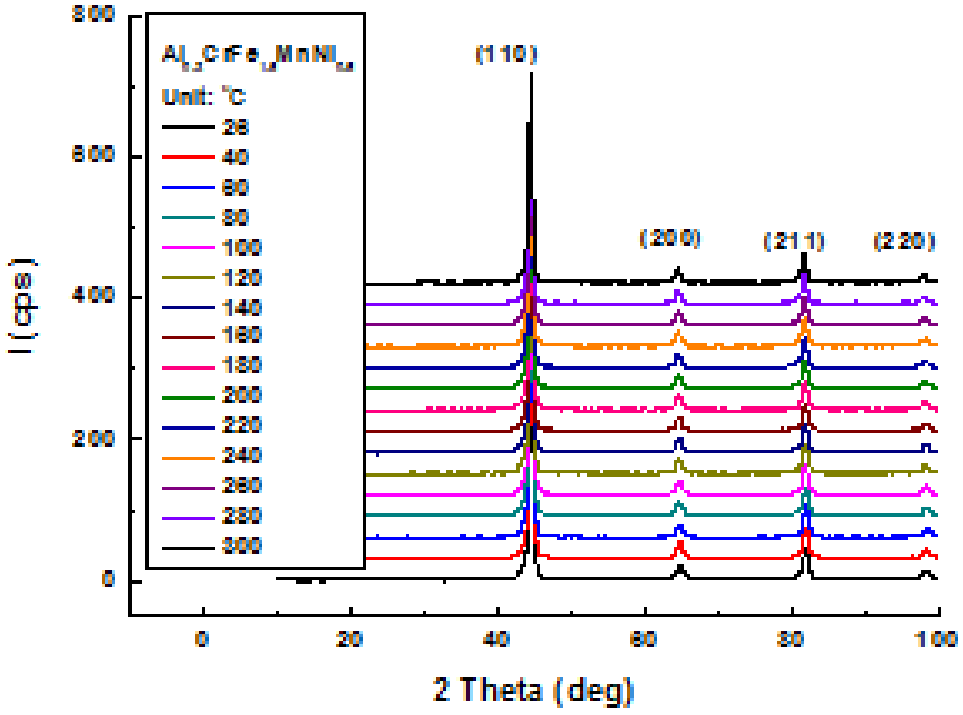
Supplementary materials

1.



Temperature dependent XRD profiles of HEAs.

2.

Find the ρ(T) at 75°C, 150°C, and 225°C. So we have three equations:

$$\rho(348) = \rho(0) + A(\frac{348}{\theta_D})^n \int_0^{\frac{\theta_D}{348}} \frac{x^n}{(e^x - 1)(1 - e^{-x})} dx \qquad (1)$$

$$\rho(423) = \rho(0) + A(\frac{423}{\theta_D})^n \int_0^{\frac{\theta_D}{423}} \frac{x^n}{(e^x - 1)(1 - e^{-x})} dx \qquad (2)$$

$$\rho(498) = \rho(0) + A(\frac{498}{\theta_D})^n \int_0^{\frac{\theta_D}{498}} \frac{x^n}{(e^x - 1)(1 - e^{-x})} dx \qquad (3)$$

(1) - (2) and (1) - (3) to eliminate ρ(0),

$$\rho(348) - \rho(423) = A\left\{(\frac{348}{\theta_D})^n \int_0^{\frac{\theta_D}{348}} \frac{x^n}{(e^x - 1)(1 - e^{-x})} dx - (\frac{423}{\theta_D})^n \int_0^{\frac{\theta_D}{423}} \frac{x^n}{(e^x - 1)(1 - e^{-x})} dx\right\}$$

(4)

$$\rho(348)-\rho(498)=A\left\{\left(\frac{348}{\theta_D}\right)^n\int_0^{\frac{\theta_D}{348}}\frac{x^n}{(e^x-1)(1-e^{-x})}dx-\left(\frac{498}{\theta_D}\right)^n\int_0^{\frac{\theta_D}{498}}\frac{x^n}{(e^x-1)(1-e^{-x})}dx\right\}$$

(5)

(4)/(5) to eliminate A,

$$\frac{\rho(348)-\rho(423)}{\rho(348)-\rho(498)}=\frac{\left\{\left(\frac{348}{\theta_D}\right)^n\int_0^{\frac{\theta_D}{348}}\frac{x^n}{(e^x-1)(1-e^{-x})}dx-\left(\frac{423}{\theta_D}\right)^n\int_0^{\frac{\theta_D}{423}}\frac{x^n}{(e^x-1)(1-e^{-x})}dx\right\}}{\left\{\left(\frac{348}{\theta_D}\right)^n\int_0^{\frac{\theta_D}{348}}\frac{x^n}{(e^x-1)(1-e^{-x})}dx-\left(\frac{498}{\theta_D}\right)^n\int_0^{\frac{\theta_D}{498}}\frac{x^n}{(e^x-1)(1-e^{-x})}dx\right\}}$$

The n becomes the remaining unknown parameter.