

Fe-Ni 나노결정 재료의 제조와 기계적 특성 평가
(Processing and mechanical properties of
Fe-Ni nanoparticulate materials)

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In this research we overview a new processing route for fabricating nanocrystalline(nc) Fe-Ni alloy and on its related mechanical properties. The bulk nc Fe-Ni alloys were fabricated by hot-isostatic pressing of mechano-chemically processed Fe-Ni nanoalloy powder. The temperature dependence of mechanical properties was investigated by compression and deformation morphology observations at temperatures from 162°C to 600°C. At the temperature $T < 100^\circ\text{C}$ or $T > 400^\circ\text{C}$ yield strength decreased gradually with increasing temperature, while it dropped catastrophically in the range $100^\circ\text{C} < T < 400^\circ\text{C}$. Low-temperature deformation produced two sets of macroscopic bandlike traces which consisted of ultrafine straight lines; in contrast, high-temperature deformation led to formation of microcavities accompanying which some nanograins arranged locally in regular form. The results of both compression behavior and deformation morphologies suggest that low-temperature deformation mechanism was different from that at high temperature.

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