다중기포 소노루미네센스를 이용한 β_{bc}형 수산화 니켈의 제조

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Synthesis of β_{bc}-Type Nickel Hydroxide at the Multibubble Sonoluminescence (MBSL) Condition

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Key Words: Nickel hydroxide(수산화 니켈), MBSL(multibubble sonoluminescence; 다중기포 소노루미네센스), Sonochemical reaction(음화학 반응), Ultrasound(초음파)

Abstract : Nanosized nickel hydroxide powder for alkine batteries was synthesized in aqueous or nonaqueous solution of nickel chloride with NaOH under ultrasound radiation at the multibubble sonoluminescence (MBSL) condition. Characterization by X-ray diffraction, transmission electron microscopy, FT-IR spectroscopy, as well as elemental analysis indicates the formation of β_{bc}-type nickel hydroxide. The β_{bc}-type nickel hydroxide synthesized in aqueous solution of $NiCl_2$ is slightly different that formed in nonaqueous solution of $NiCl_2$. The synthetic process of β_{bc}-type nickel hydroxide at the MBSL condition was completed within 5 minutes. Coating of nickel hydroxide particles on various oxide particles such as Al_2O_3 and SiO_2 was also prepared at the MBSL condition.

Experimental Study of Temperature Distribution of Two-Stage Cascade Refrigeration System Using R508b as Working Fluid at Low Stage

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R508b를 사용한 2원 냉동 시스템의 온도 분포에 관한 실험적 연구

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Key Words: R508b, Two-Stage Cascade Refrigeration system(2원 냉동 시스템)

Abstract : PTwo-stage cascade vapour compression cycle is one of method to achieve super low temperature under -80 ℃. This system requires two different types of refrigerant at higher and lower stages. By Montreal Protocol, several refrigerants for the low-stage system as well as high stages have been banned due to its threat to ozone layer. This paper presents the experimental study on temperature distribution of two-stage cascade vapor-compression system for achieving super-low temperature. R 22 was applied to the high stage cycle. Meanwhile, azeotropic zero-ODP refrigerant, R508b of R23/R116 (46.0/54.0) was utilized in the low stage cycle, this refrigerant has several advantage including lower normal boiling point compare to its compositing element. On this experiment, cooling chamber was filled with ethyl alcohol as refrigerant load. By changing the volume of cooling chamber fluid, temperature distribution of the system was observed. More ethyl alcohol mass in the cooling chamber, longer steady state condition achieved. It is also found that the change of ethyl alcohol in the cooling chamber gives little effect on the final temperature distribution.