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ZONE REFINING OF $LiY_{1-x}Gd_xF_4$ (x= 0, 25, 50 and 100 mol%).

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The LiF-GdF_3 phase diagram presents two invariant points: a eutectic at 25 mol% GdF_3 and 700°C, and a peritectic at 34 mol% GdF_3 and 750°C. $LiGdF_4$ (GLF) is the unique intermediary compound. In a previous work the phase diagrams of the system LiF- $Gd_{(1-x)}Y_xF_3$ (x= 0, 50, 75 and 100 mol%) have been constructed using differential thermal analysis (DTA) [1]. It was observed that addition of yttrium in the $LiGd_{(1-x)}Y_xF_4$ matrix moves the GLF incongruent melting behavior toward the congruency. The melting behavior of these compounds was inspected using the zone refining technique under a HF atmosphere. The compositions of the starting materials were those determined in the phase diagrams for the peritectic reactions. Five samples extracted along the refined bars were utilized to DTA analysis. The rare earth concentrations in each sample were determined by HPLC and X-ray fluorescence. It was observed that the stability of the $LiGd_{(1-x)}Y_xF_4$ compounds is lower when compared with the well known $LiYF_4$. The GdF_3 tends to precipitate decreasing the efficiency of the process.

[1] I.M. Ranieri, PhD thesis.