Nickel aluminate (Ni$_2$AlO$_4$) spinel was formed using transferred arc plasma (TAP) melting in a single step processing. For the same, commercially available NiO and α-Al$_2$O$_3$ powders were mixed in 1:1 molar weight ratio in a ball mill and then melted in a specially designed transferred arc plasma torch at different operating conditions. Argon gas was used to produce plasma at atmospheric pressure. XRD, SEM and Micro Raman studies were conducted to characterize the processed samples and the results conclude that 10 kW of torch input power level and 5 mins of processing times are appropriate for obtaining the highest percentage Ni$_2$AlO$_4$ spinel. The efficiency of spinel formation increases with the melting time up to a certain level of input power and time, thereafter it decreases.