Figure 2 shows a scanning electron microscopy image of the Pt/mordenite zeolite catalyst. The surface morphology has a homogeneous morphology. High surface area improves the reactant adsorption. The surface area is playing a key role in the catalytic activity. Higher surface area improves the reactant adsorption. The catalysts surface area of the Pt/mordenite zeolite catalyst was measured by Brunauer–Emmett–Teller (BET) surface analysis. The surface area of Pt/mordenite zeolite was 296.69 m²/g. The X-ray powder diffraction (XRD) pattern of Pt/mordenite zeolite (Figure 3) exhibits the most intense diffraction peaks at 2θ = 6°–30°, and thus confirmed confirming the MOR structure of zeolite as the MOR.

The hydroisomerization of pentane and n-pentane in a binary mixture of pentane isomers were hydroisomerized by using the Pt/mordenite catalyst for under a wide range of experimental conditions. The hydroisomerization conversion products comprised of both isomerization and cracking products. Hence, in the following subsections, the effects of reaction parameters on the catalytic performance of pure n-pentane as the feed are demonstrated based on catalytic activity and isomerization selectivity. After this, the isomerization of n-pentane in the binary mixture is discussed in the last part of this section.

Figure 4 shows the conversion of n-pentane as a function of reaction temperature. The basic reactions were performed in an adiabatic environment at temperatures ranging from 150 °C to 350 °C and atmosphere pressures. It clearly shows that the catalyst is seen to strongly catalyze the hydroisomerization for the isomerization of n-pentane, particularly in the temperature range of 220 °C–350 °C. Because of the low activity of the catalyst and the low reactivity of n-pentane, the conversion of n-pentane is negligible from temperatures below 180 °C. By increasing the temperature from 180 °C to 220 °C, the conversion of n-pentane rose greatly increased significantly; however, a further increase in temperature further results in a slowly rise in conversion. This can be caused by an increasing increase in the number of sites which can be activated for the reaction when the temperatures increases to be in the range of 180 °C–220 °C, but otherwise, the conversion rate of conversion increase begins to declining as the temperature increases because of thermodynamic restrictions at higher high temperature. In other words, an increasing the temperature always results in means a faster increasing...
reaction rate. At low temperatures, the low reaction rates cause the actual conversion to be far below the equilibrium conversion because of the low reaction rate. On the contrary, at higher temperatures the equilibrium conversion will be more easily achieved because of the high reaction rate.