Abstract
Recently more than 150 million tonnes of plastics were produced in the world. On the one hand, the consumption and production of polymers are increasing, on the other hand as landfill and incineration become more expensive and less accepted. The increasing amount of polymer wastes from them generates further mainly environmental problems. The recycling of plastic wastes is gaining increasing importance. Pyrolysis is one promising method for the treatment of mixed and contaminated plastic wastes. In this way the plastic wastes are converted into fuels or other valuable feedstock for the petrochemical industry. In present work catalytic cracking of waste plastics blend with HGO [Libyan gas oil supplied by the Zawia Oil Refinery Company boils in the range of 275-375°C] was investigated using H-ZSM5and H-BETA. Reaction systems that were studied included high density polyethylene HDPE and polypropylene blend with HGO, reactions were carried out in one litre micro autoclave reactor under different conditions of weight, temperature and type of catalyst. The optimum conditions were 2.5% catalyst by weight of total feed stock, one hour, atmospheric presser and three temperatures selected 400°C, 425°C and 450°C. The product distribution for the system [plastics and HGO] provided some good results high yield of liquid [gasoline] up to 210°C, gases and small amount of heavy oils. Some analysis was used to qualify and quantify the product. The results from GC.MS analysis showed that the yield of gasoline (c5-c12) over H-ZSM5 higher than H-BETA. In case of 5%PP, 15%HDPE and 80%HGO over H-ZSM5 at 450°C, 96% total conversion achieved. The result from TGA in the same case is 15% by weight. Also the theoretical calculations to quantify the produced gases after burning of waste plastic in rotary kiln reactor have been evaluated. It is found that the suitable ratio of CO:H2 to produce methanol is 7:1.