



CHAPTER I

INTRODUCTION

1.1 Introduction and motivation

Environmental protection has been a serious concern in the civilized nations of the world. It has been known that lack of an appropriate waste disposal and a huge of consumers lead to the environmental deterioration. Plastics wastes are more and more generated by industries and municipalities each day. The statistics shows that plastics waste in municipal solid wastes (MSW) in Thailand reached 7.7 thousand tons/day in the year 2000 that increasing 2.4 thousand tons/day from 1998 (Pollution Control Department; PCD, 2004). The increasing of plastics waste has a negative impact on the management of solid wastes. Usually, there are three existing techniques for plastics disposal are landfilling, incineration and recycle. All of these still have their own-disadvantage. Plastics disposal by landfill needs a vast area and plastics themselves need very long time to be degraded. Moreover, it is not worthy to dispose the plastics wastes when no reaching their lifetime. In case of incineration, air pollution, such as dioxin, which is a hazardous material, is produced and released to the atmosphere (National Metal and Materials Technology Center; MTEC, 1998). Nevertheless, incineration gives pretty amounts of heat energy but it still does not enough to produce electricity.

Recycling is an alternative way to manage the plastics waste. Plastics waste recycling is a method of reducing the quantity of net discharges of MSW. Furthermore, plastics recycling also offers a potential to generate demonstrable save in fossil fuel consumption because the recycled plastics required less energy than that consumed in the production of the same resins from virgin feedstock (Curlee, T.R. *et al.*, 1991). Therefore plastics waste recycling conserves both virgin material and energy consumption. In addition, the plastics waste recycling also provides a comparatively simple way to make a substantial reduction in the overall volume of MSW. Recycling plastics combines with four phases activities, namely collection, separation, processing (manufacturing) and marketing. When plastics with different types are mixed and then recycled together; it is found that the quality of the recycled mixed plastics is worse than that of those virgin one. For instance, as a little as 1 ppm of PVC in PET can discolour PET. PET will be hazy (Ehrig, R.J., 1992). Therefore, cost of the recycled mixed plastics is significantly lower. From above, plastics wastes must be separated based on type of plastics used before recycling. Thus, individual separation of the mixed plastics waste is an important activity in recycling plastics process in order to keep their

properties and value. Price of some common plastics virgin plastics resins was reported by Thai Plastics Industries Association in July 2002 (Table 1.1). These led authors to investigate in mixed plastics waste separation by combination of sink-float method and selective flotation technique.

Table 1.1 Price of some common plastics resins in July 2002 in Thailand
(Thai Plastics Industries Association, 2002)

Plastics resins	Price (Baht/Kg.)
PVC injection grade	41.00
LDPE film grade	26.00 – 28.00
LDPE injection grade	27.00 – 29.00
HDPE film grade	24.00 – 26.00
PP film grade	25.00 – 26.50
PP yarn grade	24.00 – 25.00
HIPs	31.00 – 32.00
ABS	39.00 – 42.00
GP-PS	30.00 – 31.00
PC	130.00
PET	37.00
PU	228.00

1.2 Objectives

The main objective was:

- To individually separate a mixture of plastics waste by combining between sink-float separation and selective flotation technique.

The specific objectives were:

- To find out an optimal condition for separating each plastics from a mixture.
- To determine the purity of each plastics waste after separating.
- To construct a flotation cell.

This work was formatted into five chapters. Introduction, motivations and objectives of this research were considered in Chapter I. Theoretical background and related works were concerned in Chapter II. In addition, it also consisted of what are the plastics, how to manage the plastics wastes, recycling trend in Thailand and selective flotation, which was effective for plastics wastes separation. Methodology for plastics wastes separation, by combination between sink-float method and selective flotation technique, was considered in Chapter III. Results, discussions and conclusions of this experiment were in Chapter IV and V, respectively.