CHAPTER I

INTRODUCTION

Solder mask or solder resists are coating materials used to mask or to protect selected areas of a printed circuit board (PCB) from the action of a solder. Specifically, a solder mask is a coating which masks off a PCB surface and prevents those areas from accepting any solder during vapor phase or wave soldering processing. The prime function of a solder mask is to restrict the molten solder pick up or flow to those areas of the printed circuit board, holes, pads and conductor lines that are not covered by the solder mask.[1]

The available solder masks are broadly divided into two categories, i.e., permanent solder masks and temporary solder masks. A distinction is made between permanent and temporary solder masks. The temporary solder masks are those that soluble in organic solvents, water or can even be peeled off from a circuit board but permanent solder masks are not removed and thus become an integral part of the PCB.

Thailand has a high growth in electronic industry as can be seen from the values of PCB production shown in Table 1.1. Therefore, a lot of solder masks have been used in the process every year.

Table 1.1 World PCB production (in US$ millions, converted at average 1996 exchange rates).[2]

Region & Country	1995	1996	1997	2000	2000 (%)
World Total	26,740	28,320	30,194	37,250	100
Asia Pacific Total	13,535	14,420	15,780	19,810	53.2
Thailand	319	330	380	490	1.3

Thailand was unable to produce solder mask for consumption in electronic industry. All solder masks were imported from foreign countries such as Malaysia, England, Hongkong and the United State of America. Therefore, this research aims at developing a method for the production of temporary peelable solder mask.

From natural rubber, *cis*-polyisoprene, has an attractive range of physical properties. The level of adhesion is sufficient enough to prevent ingress of molten solder, plating or coating material, yet also low enough to allow easy dry stripping mechanically or by hand. Therefore, natural rubber latex is raw material available for the production of peelable solder masks.

At present, Thailand is the world's largest producer and exporter of natural rubber since 1991. The total rubber area in Thailand is currently around 1.92 million hectares. The main area (87.5%) is in the south and in the southeast (10.0%) and the minor is in the northeast (2.5%). Natural rubber production of Thailand in 1997 was 2.0 million tons. It is expected that Thai rubber production will reach 2.21 million tons in 2000[3].

The government has a strong policy in developing the rubber industry, as it is one of the top ten-dollar earners of the country. Therefore, this research may be a novel way to increase rubber consumption and increase the values of the rubber product.

Objectives

1. To study the appropriate ingredients and methods for preparing peelable solder mask from natural rubber latex.
2. To study the properties of the prepared solder masks.

Scope of the Investigation

For the preparation of peelable solder mask from natural rubber latex, the appropriate formulations were studied. The solder masks were prepared by prevulcanization of the concentrated natural rubber latex with suitable additives by heating at 70-80°C. Additive dispersions were prepared by ball mill and assessing the average particle size of dispersions. The time of prevulcanization was determined for the rapid drying time. The appropriate formulations were studied by changing the amounts of ingredients, for example, stabilizers, vulcanizing system and filler. The vulcanized sheets from prevulcanized latex were tested for the mechanical properties. The prevulcanized compound latex that had good properties was made viscous by mixing with a thickener. Thus, physical properties and thermal properties were determined.