SYNTHESIS AND CHARACTERIZATION OF CYCLOTRIPHOSPHAZENES BEARING CHALCONES DERIVATIVES

Zainab Ngaini and Norashikin I. Abdul Rahman
Department of Chemistry, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak, Malaysia

A series of new cyclotriphosphazenes bearing chalcones derivatives, $N_3P_3Cl_5[OC_6H_4CH=CHC(OC_6H_4OC_nH_{2n+1})1]$ and $N_3P_3[OC_6H_4CH=CHC(OC_6H_4OC_nH_{2n+1})1]6$, has been synthesized. A convenient synthetic method was performed from the reaction of hexachlorocyclotriphosphazenes with one and six equivalents of $(E)-3-(4-(alkyloxy)phenyl)-1-(4-hydroxyphenyl)prop-2-en-1-one (2a–c)$. The compounds differ in the length of alkyl groups, $C_nH_{2n+1}$, where $n = 10, 12, and 14$, respectively. All the products were obtained in high yields. The structures of the synthesized compounds were defined by elemental analysis, IR, $^1H, ^13C$, and $^{31}P$ NMR.

Keywords Alkyloxy; chalcones; hexachlorocyclotriphosphazenes

INTRODUCTION

Phosphazenes are compounds that contain a framework of alternating phosphorus and nitrogen atoms, either in cyclic or linear form. Studies on linear, cyclo-, and polyphosphazenes have been widely investigated. These compounds are reported to possess interesting biomedical properties and have promising applications such as effective flame retardants for fiber materials. Nucleophilic substitutions of hexachlorocyclotriphosphazenes have been widely reported. The reaction involves the substitution of chlorines by various nucleophiles such as phenols, amine, and azo compounds.

Synthesis of cyclotriphosphazenes bearing cinnamates and hydroxychalcones as side groups had been studied for photosensitive phosphazenes that could undergo photo-cross-linking reaction under UV irradiation. In photochemistry, chalcone derivatives have been reported to possess outstanding nonlinear optic properties for optical communications and optical electronics, liquid crystal displays, and alignment film. Chalcones have also been reported to promote excellent blue light transmittance and good crystallallity, high photosensitivity, and thermal stability for various crystalline electro-optical devices.

Received 10 February 2009; accepted 13 March 2009.

The authors thank Universiti Malaysia Sarawak and Ministry of Science, Technology and Innovation (MOSTI) for financial support through FRGS/01(03)/608/2006(41).

Address correspondence to Dr. Zainab Ngaini, Department of Chemistry, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak 94300, Kota Samarahan, Sarawak, Malaysia. E-mail: nzainab@frst.unimas.my, nzainab@gmail.com