# Heating Time Dependent Pore Size of Porous Composite from Waste Glass

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**Abstract.** Porous composites from waste glass had been synthesized by the simple heating process. The ability in controlling pore size was controlled by adjusting the time of melting point. In this study, the time of melting process was used as pore-forming agent in composite from waste glass. The composites from waste glass had been synthesized at 750°C with controllable of times 1, 2, and 3 hours. The characterization was showed by BET and BJH method. The composites from waste glass have decreased value of surface area. The composites with controllable of time 1, 2, and 3 hours, each other have specific surface area 0.820 $m^2/g$, 0.734 $m^2/g$, and 0.445 $m^2/g$ and pore sizes at order 21.358 Å, 16.188 Å and 16.152 Å. Porous composites from waste glass could be used in various applications, such as water filter.

## Introduction

Industrial wastes are usually concerned by people as problem society during increases density of population and the living standards of modern world, no exception waste glass. Waste glasses are inorganic solid waste which unable to decomposes naturally that cause environment problem if not managed or recycle properly [1]. Nowadays, recycle waste glass as porous composite give attention to many researchers due to it has low cost fabrication and widely use as insulating material, lightweight structural laminates, acoustic absorbers, diffused aeration, and filter [2,3,4]. Waste glasses have a lower melting point than the other constituent materials, such as $SiO_2$, $Al_2O_3$, etc. The melting point of waste glasses at 700 ℃ [5].

The aim of this study is developing waste glasses as porous composite for water filter. Porous glass composite is suitable water filter because possess good mechanical properties, water permeability and chemical inertness [6]. Pore size of porous composite play an important role during filtration process because it influence water permeability, mechanical properties, and also avoid water impurities flows in filter system. Generally, a glassy phase shows metastable or immiscible phenomena. Raw material and complement components for control chemical composition are mixed and then heated at arbitrary temperature to generate a phase separation texture. Then, an unwanted phase is leached to form pores [7]. Therefore, heating time and temperature will control pore sized of porous composite from waste glass.

Properties of porous waste glass such as specific surface area, pore distribution can be calculated from gas adsorption or desorption. The determination of the specific area is usually based on the multilayer adsorption theory proposed by Braunauer Emmett, and Teller (BET method) [8]. In

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