

ABSTRACT

The present inventors found that irradiating a film of a thiophene polymer that is a pure organic compound with light allows the thiophene polymer film to act as a light absorber and catalyst that produces hydrogen peroxide from water and water-dissolved air (oxygen) at extremely high efficiency, and this film can work in alkaline water in which a film of a general-purpose inexpensive water-oxidizing catalyst, which is used as a counter electrode, is active, leading to the completion of the present invention. The present invention provides an environmentally compatible and simple method for producing hydrogen peroxide at extremely high efficiency, comprising combining a film of a catalyst for light absorption and oxygen reduction that consists of a thiophene polymer with a catalyst for water oxidation, immersing the combination in alkaline water, and irradiating the light-absorbing oxygen reduction catalyst film with light.