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# Trade-Off in Fire-Retardant Solar Cell Materials and Environmental Issues

**Takashiro Akitsu*** **and Kenta Mizuno**

**Affiliation:** Department of Chemistry, Faculty of Science, Tokyo University of Science, Japan

***Corresponding author:** Takashiro Akitsu, Department of Chemistry, Faculty of Science, Tokyo University of Science, 1-3 Kagurazaka, Shinjuku-ku, Tokyo 162-8601, Japan, E-mail: aktisu@rs.kagu.tus.ac.jp

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In recent years, several types of solar cells, such as polycrystalline silicon, compound semiconductor and organic thin films [1], have been and grown and developed as one of the promising renewable energy devices for low cost and safety compared with nuclear power generation. They were composed from many components and their materials generally. As for Dye Sensitized Solar Cell (DSSC), which may be high efficiency and easy to assemble but not be expensive so much, not only inorganic titanium oxide and organic or metal complex dyes but also organic solvents as electrolyte. Furthermore, a condensing lens made of plastic are also used to improve power generating efficiency.

As grown solar cells, their risks to disturb extinguishing, for example, getting electric shocked for firefighters and outbreak of combustion gases, have appeared in case of fire, because a solar cell never stops power generation by receiving sunlight. Currently, a paint which interrupts light of the sun and improvement of the incombustibility of solar battery modules have been investigated energetically [2]. As for new strategy of flame retardant for DSSC, we have studied on Br-substituted metal complexes on the hypothesis that they can act for dual purposes, namely long-wavelength light absorbing DSSC dye and flame retardant without chain reactions as pure organic compounds [3]. Although brominated flame retardants are prevailing, environmental pollution is becoming serious. Bromine flame retardants have been used for a long time as they suppress the combustion reaction by the radical trapping effect. As a concrete example, there are cases around the Great Lakes [4].

PBB having a structure in which bromine is substituted for an aromatic ring was used as a brominated flame retardant. However, it is regulated by polluting the environment. Thereafter, new brominated flame retardants have been developed, but it has been repeated that it will be subject to regulation.

Solar cells to solve energy problems lead to danger during fire. The application of flame retardancy can cause new problems of environmental pollution. If you pursue economic efficiency and efficiency, the environment becomes obscure. Cost and efficiency are reduced if environmental consideration is required. If you pursue a newsletter like this, one is a trade-off relationship that cannot be reached. Scientists have a broad perspective when developing and it will be necessary to answer the demands from society with technology.

In consideration of the environment, there is a research example to obtain a heat stabilizer of a plastic (PVC) from amide regenerating waste plastics [5].

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