



## Photo and Thermal degradation of Plasticized para-Substituted polystyrene in solid films

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### Abstract:

In recent years, much attention has been focused on research to prepare new generation of Poly (para - substituted styrene), and to study the irradiation, thermal and plasticization effects on stability of these new polymers. The effect of irradiation of plasticized Para- substituted polystyrene in solid films was studied at different intervals of irradiation times and at different percentages of added phthalates and terephthalates plasticizers. The degradation process was followed by UV-VIS, Fluorescence and FT-IR Spectroscopic techniques. to determine the type and amount of degradation that occurs during irradiation. The irradiated pure and plasticized polymers solid films showed an increase in the intensity of absorption band by the increase in irradiation time and increase in the amount of added plasticizers. On the other hand the intensity of fluorescence was decrease upon the increase in irradiation time and increase in the amount of blended phthalate and terephthalate plasticizers. The analysis of the FT-IR spectra of the irradiated and non-irradiated samples, showed a noticeable formation of new bands, and their intensity was found to increase with the increase in irradiation time and also with the increase in the amount of added plasticizer. In addition, the observed increase in the intensities of the carbonyl and hydroxyl absorption regions of the FT-IR spectra, providing evidence for the photodegradation as well as photo-oxidation of polymeric chains. Some kinetics work was applied to the results on fluorescence intensity of the excimeric emission to evaluate the quenching efficiencies and photo quenching rate constant by applying Al Ani - Hawi equation. Electrophilic substitution such as (Cl, and Br) in the para position of the polymer backbone should less stability towards UV - Irradiation, whereas, nucleophilic substitution such as (-H, -CH<sub>3</sub>, -OCH<sub>3</sub>, -OC<sub>2</sub>H<sub>5</sub>, -C<sub>6</sub>H<sub>5</sub>, -CH<sub>3</sub>, -OCH<sub>3</sub>, Phenyl and -C(CH<sub>3</sub>)<sub>4</sub> should higher stability towards irradiation of plasticization.

### Biography:

Professor Al Ani has completed his PhD at the age of 26



years from Southampton University - England , UK, and postdoctoral studies from Texas University, Austin, Texas - USA .He was a visiting professor at Liverpool University at the Inorganic and industrial department, Liverpool - England, UK.. He has a professor post at Baghdad University, Department of Physical Chemistry - Iraq , a professor of physical chemistry at Oran university of science and technology - Algeria, also at the Hashemite university - Jordan. He was dean of Faculty of Pharmacy (2014 - 2017) at Jdara University, Jordan. Currently, he is Head of the Pharmaceutical since department at Jadara university - Irbid , Jordan. He has published more than 48 original articles in international journals, and attended more than 19 international conferences around the world.

### Publication of speakers:

1. Safi, Saria & Mouamin, Thanaa & Sieadi, Wadhah & Al Ani, Khalid. (2014). Irradiation Effect on Photodegradation of Pure and Plasticized Poly (4-Methylstyrene) in Solid Films. *Materials Sciences and Applications*. 05. 300-315. 10.4236/msa.2014.55036.
2. Al Ani, Khalid & Ramadhan, Afrah & Anabtawi, Mai. (2014). Irradiation Effect on Stability of Plasticized Poly(Fluorostyrene) Isomers in Solution. *International Journal of Photochemistry*. 2014. 1-12. 10.1155/2014/536068.
3. Al Ani, Khalid & Ramadhan, Afrah. (2015). Kinetic Study of the Effect of Plasticization on Photodegradation of Polystyrene Solid Films. *Materials Sciences and Applications*. 06. 617-633. 10.4236/msa.2015.67064.

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