# Field of the invention

This invention is directed to new photopolymerizable compositions and to improved addition polymerizable elements prepared from said photopolymerizable compositions. More particularly this invention is directed to such compositions and elements which have increased speed and enhanced thermal stability. Still more particularly this invention is directed to photopolymerizable compositions and elements which are useful in the dry transfer methods of reproduction as disclosed in Burg & Cohen U.S. Patents 3,060,023; 3,060,024; 3,060,025; Heiart U.S. 3,060,026; Colgrove U.S. 3,353,959 and Jeffers U.S. Ser. No. 407,245 filed Oct. 28,1964, now Patent No. 3,408,191.

# Description of the prior art

Photopolymerizable compositions and elements are those described in Plambeck, U.S. Patents 2,760,863 and 2,791,504. Martin & Barney U.S. Patent 2,927,022, the Burg & Cohen patents, the Heiart patents, the Colgrove patent and the Jeffers application referred to above. The photopolymerizable elements have on a suitable support a photopolymerizable layer comprising a polymeric binder, an addition polymerizable ethylenically unsaturated compound capable of forming a high polymer by photoinitiated addition polymerization, and an addition polymerization initiator activatable by actinic light. Certain of these photopolymerizable compositions, particularly those which contain esters of acrylic acid, while extremely useful in the preparation of relief printing elements, lithographic printing elements, and images from dry transfer processes as described in the above patents, upon storage, become less sensitive to actinic light due to the diffusion of oxygen from the air into the photopolymerizable layer. After exposing and processing, as in the case of relief elements, or peeling apart as in the case of dry transfer processes the image areas of such oxygen desensitized elements are of poor quality because of low speed and poor storage stability. There are means of removing or preventing oxygen from saturating or desensitizing the photopolymerizable layer.

One example is storing or treating the element in an essentially oxygen-free atmosphere of inert gas. This technique gives satisfactory results but requires special equipment and is time consuming. It is also known to add a stannous salt of an acid soluble in the polymerizable ethylenically unsaturated monomer and compatible, but non-reactive with the addition polymerizable initiator. While stannous salts, e.g., stannous chloride, substantially reduce the influence of oxygen and improve the storage stability and photographic speed of the photopolymerizable element, it has the great disadvantage of being ionizable and unstable and it loses its effectiveness with aging.

This invention pertains to new photopolymerizable compositions and layers which comprise:

(1) 40 to parts by weight of a compatible, coherent film-forming marcromolecular organic polymer having a molecular weight greater than 10,000; (2) 10 to parts by weight of a normally non-gaseo-ous, ethylenically unsaturated compound containing 1 to 4 terminal ethylenic groups having a molecular weight of at least 200, a boiling point above C. at normal atmospheric pressure and being capable of forming a high polymer by photoinitiated addition polymerization; (3) 0.001 to parts by weight of an addition polymerization initiator activatable by actinic light and inactive thermally below C. and preferably below C.; and (4) .01 to parts by weight of at least one covalent organometal compound of tin, lead, germanium, or titanium having at least one carbon to metal bond.