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CYCLIC DIONES AS EMULSION STABILIZERS AND ANTIFOGGANTS

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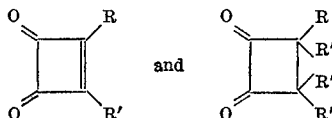
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No Drawing. 10 Pages Specification

The stabilization against fog of photographic silver halide emulsions and elements is obtained through the use of cyclic diones wherein there are four carbon atoms in the ring. The stabilizing compounds contain at least one radical or atom selected from the group consisting of hydroxy, alkoxy and halogen. The useful compounds are represented by the following structural formulas:



wherein each R can be hydroxy, alkoxy or halogen and each R' can be hydrogen, alkyl, aryl, hydroxy, alkoxy or halogen. A useful range for the concentration of the stabilizer is from about 0.5 gram to about 20 grams per mole of silver halide. Examples of suitable compounds include 3,4-dihydroxy-3-cyclobutene-1,2-dione, 3-methoxy-4-phenyl-3-cyclobutene-1,2-dione, 3-hydroxy-4-phenyl-3-cyclobutene-1,2-dione, 3,4-diethoxy-3-cyclobutene-1,2-dione, 3,4-diethoxy-cyclobutane-1,2-dione, 3-bromo-4-phenyl-3-cyclobutene-1,2-dione, and 3,4-dihydroxycyclobutane-1,2-dione.

Photographic silver halide emulsions and elements stabilized as described can be chemically sensitized, e.g., with noble metal sensitizers alone or in combination with sulfur or selenium sensitizers. They can contain spectral sensitizers, incorporated color forming couplers, incorporated developing agents, other antifoggants, hardeners, plasticizers, coating aids, and other suitable photographic addenda, such as described in U.S. Patent 3,297,446 (columns 4-9).