



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C08F 246/00, G03F 7/038, 7/039	A1	(11) International Publication Number: WO 99/61497 (43) International Publication Date: 2 December 1999 (02.12.99)
(21) International Application Number: PCT/EP99/03418 (22) International Filing Date: 18 May 1999 (18.05.99) (30) Priority Data: 09/085,880 27 May 1998 (27.05.98) US (71) Applicant: CLARIANT INTERNATIONAL, LTD. [CH/CH]; Rothausstrasse 61, CH-4132 Muttenz (CH). (72) Inventors: MCCULLOCH, Iain; 18 Hampton Court, Basking Ridge, NJ 07920 (US). EAST, Anthony, J.; 62 Niles Avenue, Madison, NJ 07940 (US). KANG, Ming; 285 McFarlane Road, Colonia, NJ 07067 (US). KEOSIAN, Richard; 554 Roundtable Drive, Nazareth, PA 18064 (US). YOON, Hyun-Nam; 88 Colchester Road, New Providence, NJ 07947 (US). (74) Agent: HÜTTER, Klaus; Clariant GmbH, Patente, Marken, Lizenzen, Am Unisys-Park 1, D-65843 Sulzbach (DE).		(81) Designated States: CN, JP, KR, SG, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: WATER SOLUBLE NEGATIVE-WORKING PHOTORESIST COMPOSITION (57) Abstract A water soluble polymer that when used with a suitable photoacid generator (PAG) forms a negative working water soluble photoresist. The polymer comprises a backbone, such as polyvinyl ether, coupled by a linkage group to an acetal protected β-keto acid group. With the addition of a number of commercially available photo acid generators, the polymer formulation forms a negative working photoresist that is water soluble. Exposure to radiation will cause a photoacid catalyzed deprotection of the acetal group, yielding a β-keto acid which, upon heating, will undergo decarboxylation, which results in a water insoluble photoproduct and evolution of CO₂ as a byproduct. This photochemically induced reaction results in a significant change in the polymer solubility parameter, and the product is no longer soluble in water. As this solubility change does not require crosslinking, there will be no swelling of the resist images on exposure to the aqueous base during development, and hence no loss of resolution. This enables the photoresist to be used at fine resolutions at in-line and deep UV wavelengths.		