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[\[PDF \(658K\)\]](#) [\[References\]](#)**Effect of Solvent Type on the Degradation of 4-MET**[Kou FUJITA](#)¹⁾, [Shen MA](#)²⁾, [Rui LI](#)²⁾, [Jun LI](#)²⁾, [Takuji IKEMI](#)¹⁾ and [Norihiro NISHIYAMA](#)²⁾

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Abstract:

This study sought to investigate the degradation mechanism of 4-methacryloyloxy ethyl trimellitic acid, 4-MET, which is commonly used as an acidic monomer in solvated self-etching primers or one-step bonding agents. To this end, we examined the effects of solvent type used—such as ethanol, methanol, and acetone—on the degradation mechanism of 4-MET by using the ¹³C NMR technique.

The degradation mechanism of 4-MET was strongly dependent on the type of solvent used. When an alcohol-based solution was used for 4-MET, the esterification of 1- or 2-carboxylic acid in 4-MET occurred. However, when an acetone solvent was used for 4-MET, the esterification reaction did not occur. Increases in the aging period of 4-MET solvated solutions resulted in the hydrolysis of the benzoyl ester portion in 4-MET. The 2-hydroxyethyl methacrylate, produced as a subproduct, also became hydrolyzed. In addition, methacrylic acid, non-esterified and esterified trimellitic acid, as well as ethylene glycol were produced as subproducts. In particular, the production of trimellitic acid and ethylene glycol affected the bonding efficacy and durability of the resin to the tooth created by self-etching primers or one-step bonding agents that contained the altered 4-MET.

Key words:[Acidic monomer](#), [4-MET](#), [Degradation](#), [¹³C NMR](#)

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