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[\[Image PDF \(2033K\)\]](#) [\[References\]](#)**A Review of Chemical-approach and Ultramorphological Studies on the Development of Fluoride-releasing Dental Adhesives Comprising New Pre-Reacted Glass Ionomer (PRG) Fillers**[Kunio IKEMURA](#)¹⁾, [Franklin R. TAY](#)²⁾, [Takeshi ENDO](#)³⁾⁴⁾ and [David H. PASHLEY](#)²⁾

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Abstract:

This paper reviews our recent studies on fluoride-releasing adhesives and the related studies in this field based on information from original research papers, reviews, and patent literatures. A revolutionary PRG (pre-reacted glass ionomer) filler technology—where fillers were prepared by the acid-base reaction of a fluoroaluminosilicate glass with polyalkenoic acid in water, was newly developed, and a new category as “Giomer” was introduced into the market. On fluoride release capability, SIMS examination revealed *in vitro* fluoride ion uptake by dentin substrate from the PRG fillers in dental adhesive. On bonding durability, it was found that the improved durability of resin-dentin bonds might be achieved not only *via* the strengthened dentin due to fluoride ion uptake from the PRG-Ca fillers, but also due to retention of relatively insoluble 4-AETCa formed around remnant apatite crystallites within the hybrid layer in 4-AET-containing self-etching adhesives. On ultramorphological study of the resin-dentin interface, TEM images of the PRG-Ca fillers revealed that the dehydrated hydrogel was barely distinguishable from normal glass fillers, if not for the concurrent presence of remnant, incompletely reacted glass cores. In conclusion, it was expected that

uptake of fluoride ions with cariostatic effect from PRG-Ca fillers would endow dentin substrates with the benefit of secondary caries prevention, together with an effective and durable adhesion to dentin.

Key words:

[Pre-reacted glass ionomer \(PRG\) technology](#), [Giomer](#), [Fluoride-releasing adhesive](#)

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