

## Advanced chemically-curing glass ionomer cement (GIC) with higher strength and more fluoride release

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**Keyword**

biomaterials, tooth filling materials, preventive materials for caries, glass ionomer cement, hydroxyapatite

**Title of Inventions**

Chemically-curing type glass ionomer cement

**PCT No.:** PCT/JP2007/058885

**US Pub. No.:** US2009/0118391 A1

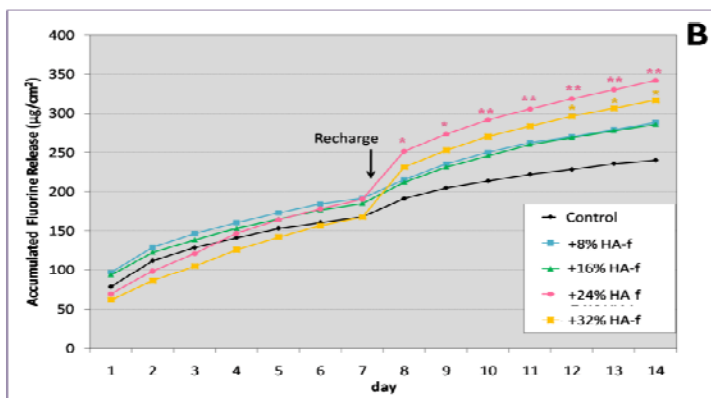
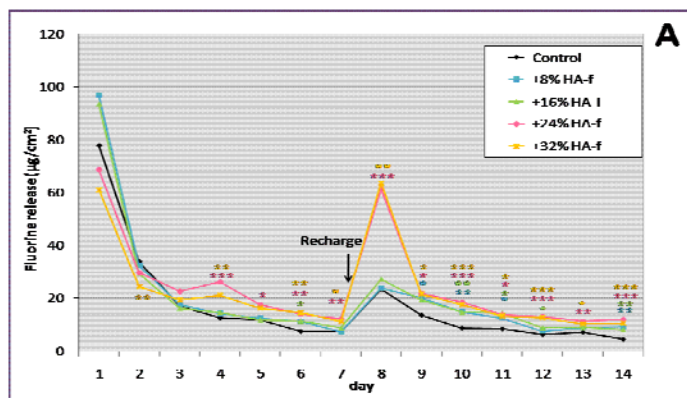
**Abstract**

At present, light-curing GIC is in the mainstream in the field of dentistry because it has stronger mechanical property than chemically-curing GIC. However, it has disadvantages as follows: lower biological affinity, smaller amount of sustained fluoride release, necessity of tooth surface treatment and a light irradiation device, etc.

The inventor found the characteristics of chemically-curing GIC were significantly improved when hydroxyapatite (HA) particulates of certain size (mean diameter: 0.6-100µm) were added.

**Detailed Description of the Invention**

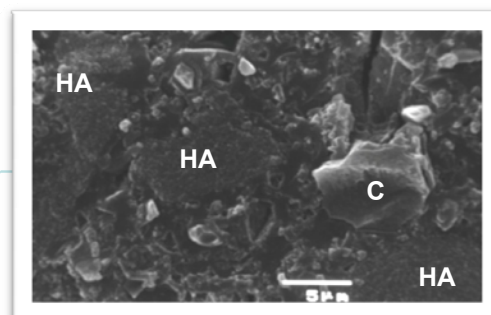
The following graphs show the amount of fluoride release with time from the control (conventional chemically-curing GIC) and HA-added GICs . It is specially noted that there was consistent increase in the fluoride volume released from HA-added samples compared to the control from day 8 to 14.



The table below shows that flexural strength (MPa) of HA-added GIC is two to three times higher than that of the control.

Control	+ 8% HA	+ 16% HA	+ 24% HA	+ 32% HA
4.98 ± 1.7	10.49 ± 3.6	14.08 ± 4.8	14.53 ± 3.8	12.69 ± 4.3

The picture below shows the fracture surface of HA-added (24%) GIC. The core (C) and HA-f particulate (HA) form firm cement matrix.



**Technical Field**

:Dental and medical

**Influence of the Invention**

:Dental filling, bone filling materials, pit and fissure sealant Caries prevention

**Purpose of the Invention**

:Improvement of chemically-curing type GIC

**Advantage of the Invention**

Mechanical strength is the same or higher than that of light -curing GIC.  
Sustained fluoride release and and its recharge characteristics are better than those of light-curing or conventional chemically-curing GIC  
The disadvantages of light-curing GIC are eliminated.

**Field of Industrial Application**

- Pit and fissure sealant
- Dental filling materials (for prepared and unprepared cavities)
- Bone filling materials