

## [II~4]

### Mild baking with water decomposing reagent for Al vacuum chamber

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The vacuum system of Pohang Light Source (PLS) has been designed to accommodate 150°C *in-situ* vacuum bakeout. However, the classical baking generally comes with the thermal deformation of Al vacuum chambers and requires rather long maintenance period for survey and realignment of them. In order to overcome this situation, we have performed several experiments by using the new chemical baking theory. Since the baking with chemical treatment at rather low temperature of 80°C is effective, we can alleviate more or less above mentioned problems.

The ultimate purpose of this experiment is to apply the theory of mild baking for PLS Al vacuum chamber in stead of high temperature baking.

Several experiments of mild baking was performed with small size Al test chamber. The main idea of chemical baking is to eliminate water molecules from the chamber by using chemical reagent such as DCP(2,2-dichloropropane). The system for chemical baking consists of three parts which are the Al test chamber, injection part, and pumping system. During the test, pressure is measured periodically with ion gauge and RGA.

As a result, the effect of chemical baking gives rise to more than 2 times at pressure in comparison with reference test (no-treatment test). We can understand the detailed mechanism of DCP through RGA data which Acetone and HCl are produced after reaction with DCP. DCP has the property of cutting of bonds of molecules, because is H<sub>2</sub>O, Acetone, CO, CO<sub>2</sub>, HCl are produced as reaction products, and reaction products such as Acetone, HCl was not detected beyond the detection limit of the RGA eg <10<sup>-13</sup>A.

From these experiments, we could find the possibility that mild baking with water decomposing reagent will be adopted for PLS aluminum vacuum chamber. Future studies will be given to the cleaning of vacuum components having complicated or sensitive structure.