

## **Characteristics of Volatile Organic Compounds from Newly Produced Building - Apartment House**

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### **Abstract**

Building materials emit high concentration volatile organic compounds(VOCs), formaldehyde(HCHO) and other hazardous air pollutants(HAPs) to indoor environment. Average value of VOCs and HCHO emission concentration were 3,770  $\mu\text{g}/\text{m}^3$ , 430  $\mu\text{g}/\text{m}^3$  in newly buildings, respectively. VOCs and HCHO emission characteristic are high emission level at initial time and decreased in course of time.

### **Introduction**

Most people in the developed world generally spend up to 90% of their time in the indoor environment, and that up to 60% of the work force work in the office(Baechler et al., 1991)

Therefore, the indoor air quality is very important in public health and welfare, as the potential cost to society of poor IAQ is very high. Some investigators were reported that the indoor levels of air pollutants can be several hundred times higher than that of outdoor(Jonathan M, 1991;Bluyssen PM et al., 1995)..

Determining the major sources of VOCs is critically important for mitigating IAQ problems in indoor environments. Environmental test(field) are important tools for characterizing organic emission from consumer and construction products and evaluating their potential impact on indoor air quality. At present, the studies of the emission effect are mainly conducted by experiments using small-scale, large-scale environmental test chamber.

The aims of this paper are two-fold; (1) to compare of the emission concentration from newly produced buildings(apartment house), and (2) to estimate of the emission concentration from building materials, performed the mock-up room test to investigate the VOCs and HCHO emission concentrations involving five kinds of the building materials.

## Experimental Method

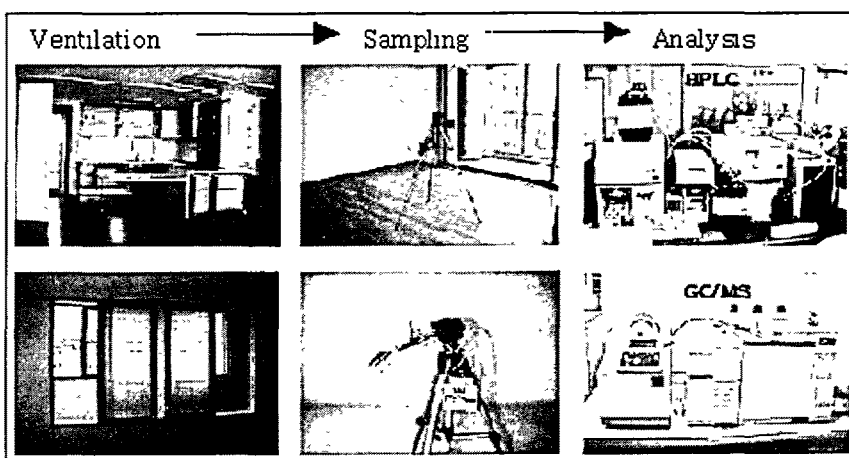


Figure 1. Schematic view of sampling procedure

Indoor air sampling was conducted under stable condition( $20\pm 2$  °C,  $50\pm 10$  %) and performed taking into general aspects of sampling strategy as ISO 16000-1. An object of this study were five newly produced apartment house at Seoul metropolitan area. Analysis of VOCs and HCHO were performed as ISO 16000-6 and EPA TO-11 method, respectively.

## Results

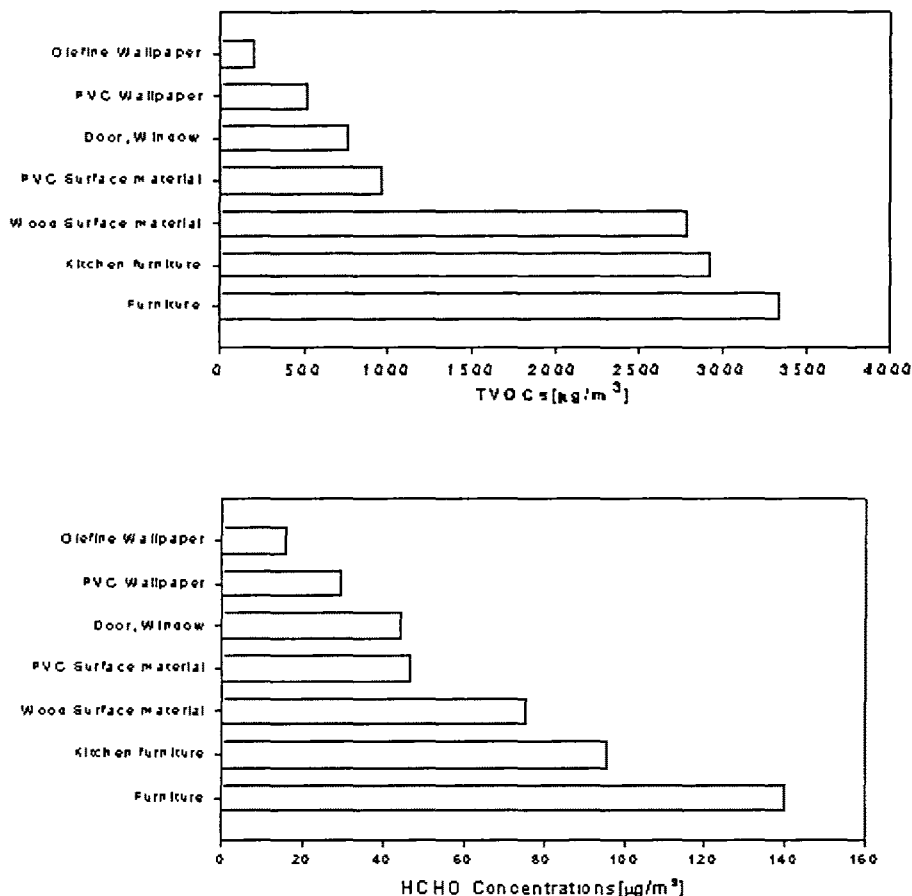


Figure 2. Characteristic of TVOCs(upper) and HCHO(lower) from building materials.

Emission concentration of TVOCs(total volatile organic compounds) and HCHO for the building were average value of TVOCs and HCHO emission concentration were  $3,770 \mu\text{g}/\text{m}^3$ ,  $430 \mu\text{g}/\text{m}^3$  in newly buildings, respectively. Compare with WHO and Japan recommendation value, our results were very higher than those of guidelines. Comparison of TVOCs and HCHO emitted from bedroom and living room, living room-TVOCs was higher than bed room-TVOCs. Mock-up room test to investigate the TVOCs and HCHO emission concentrations involving seven

kinds of the building materials was indicated in the order of the emission concentration level, general furniture > kitchen furniture > wood surface material > PVC surface material > door and window > PVC wallpaper > olefine wallpaper.

## References

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EPA, Compendium method for toxic organic compound, TO-11, 1999.