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Detecting odorous compounds emitted from building and consumer products within the European Project SysPAQ

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Introduction

In 2006 the European research project Innovative Sensor System for Measuring Perceived Air Quality and Brand Specific Odours (SysPAQ / see www.syspaq.eu) started with 10 partners involved. The main goal of this project is to develop an innovative system to measure indoor air quality as it is perceived by humans to be used as an indicator and a control device for the indoor air quality. Within this project many different building and consumer products were tested. Some of these products were several years old. The odorous Evaluation of these products has been done so far. Here the emission tests with an olfactory detection port are described.

Methods

The emission tests were done with a thermal extractor (Gerstel GmbH). At 30°C, an airflow of 100 ml/min and a sample volume of 1 litre the emissions of small sample pieces about 20 mg of 5 carpets, 1 linoleum, 2 newspapers, 2 white t-shirt (clean, used), 5 filter bags (clean, used) were sampled on Tenax sampling tubes. The analysis was performed with Tenax thermal desorption, gas chromatography and the eluate is splitted 1:1 into mass spectrometry detection and odour detection port (ODP). At the ODP test persons smell the eluate of the column and press a button in case of smelling anything during GC run. Usually 5 different samples on Tenax were prepared of each material and 5 persons smell the eluate. If 3 or more persons have an impression of odour at the same retention time

the compound is considered to be an odorous compound.

Results

VOCs emit from all materials and products. Odorous compounds can be detected from carpets, linoleum newspaper and t-shirt. From the filter bags no odorous compound can be detected. Most odorous compounds emit from the linoleum. In Table 1 the identified compounds from all products are listed which are suspected to be odorants.

Table 1. List of identified odorous compounds.

Group	Compound
aldehydes	benzaldehyde, hexanal, heptanal, octanal, nonanal, octenal, nonenal, decenal
ketones	heptanone, octanone, nonanone, decanone, MIBK
alcohols	heptanol, octanol, 2-ethylhexanol, propanediol, phenol
carbonic acids	acetic acid, propanoic acid, butanoic acid, pentanoic acid, hexanoic acid, heptanoic acid, octanoic acid, nonanoic acid
other	longifolene, camphor, benzothiazole, phenylcyclohexene

Conclusions

With the technique described here the identification of odorous compounds is often possible. Unfortunately for many odorous signals from the persons that smell no VOC can be identified at that retention time. With the detected odorous compounds an odour space will be defined to test the sensory system which will be developed in this study.