

## Media communiqué

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*Symposium about poisons in dwelling areas at the University of Zurich on November 8, 2007*

### **When dust and vapor poison the room climate**

*Whether at home or on the job, we all want to feel ourselves well and healthy in buildings and rooms. That this comes as a matter of course something must and can be done. On November 8, 2007, medical researchers as well as scientists and building industry experts met at the University of Zurich and held a symposium on the topic of «Indoor Air». Empa chemist Peter Schmid arranged the symposium program with the aim of presenting to interested layman and specialists the latest findings regarding indoor pollutants.*

News about indoor pollutants, as for instance reports of high Formaldehyde values in new or reconditioned school buildings, appear regularly in the daily media and there will in all probability be even more such reports in the future. "The increasing presence of chemicals in our environment as well as the airtight, energy-saving construction technologies can also lead to higher concentrations of volatile substances in building interiors", says Peter Schmid of Empa's Laboratory «Analytical Chemistry». In this context the continuing education symposium «Indoor Air» was held at the University of Zurich on November 8, 2007. It was organized by the Center for Xenobiotic and Environmental Risk Research Zurich, XERR, with Empa undertaking the scientific management. Empa's Laboratory «Analytical Chemistry» is world renowned for being a leading research and analyzing lab of new and suspect substances, such as Bromide containing flame retardants, and their chemical impact on the environment.

#### **Empa concentrates on research, where knowledge is still lacking**

Markus Zennegg, a scientist in the same department, reported at the workshop on grey-oily stains on bright surfaces, which, because of their sudden and unforeseeable occurrence, are also called «black magic dust». This black dust sets off particularly above heating elements, on curtains, window frames, plastic surfaces, electrical appliances and on the insides of external walls. It appears mainly in new buildings as well as after renovations and mostly during the heating season. There are many causes for this phenomenon and a «clear-cut statement about the origin is usually not possible because of the complexity of this occurrence», said Zennegg. By extensive chemical analysis, the Empa researcher could determine the innumerable components of this black dust. It contains mainly highly volatile organic compounds such as softeners from plastics or fatty acids from candle wax, textiles, leathers or cosmetics. In addition, components from wall paints, lacquers, cleaning agents, polishes, lubricants and many other materials can be traced. However, according to current scientific knowledge, no health risks are posed by these deposits

Other middle to highly volatile chemicals, namely polychlorinated Biphenyls or PCBs, were banned already more than twenty years ago, because they are suspected as being carcinogens. But, PCBs containing joint sealings in older buildings still cause high exposure today. Andreas C. Gerecke und Cornelia Seiler, also

from Empa's Laboratory «Analytical Chemistry», are researching these polluting materials as well as the decontamination of infected houses. They proved that removing the joints is not usually sufficient, since in the course of the years the PCB got into floor mats and other interior furnishings. Not less problematic are certain Bromide containing flame retardants, which protect and prevent furniture, curtains or electrical appliances from bursting into flames by the slightest spark. Some of these substances were likewise already internationally banned - such as Bromide Diphenylether -, but the knowledge about the extent and the sources of the contamination indoors is rather incomplete, according to Gerecke. Thus, for instance, high concentrations of permitted flame retardants are continued to be found in house dust.

### **When rooms and buildings make you ill**

Roger Waeber of the Federal Office for Health, Indoor Toxins, characterized the evaluation of indoor air quality as a difficult venture. Nevertheless, some health menacing pollutions can be identified, by focusing on the one hand on the structural basic conditions and on the other hand on the behavior of the inhabitants inside. The most important source of pollution in interior areas is definitely tobacco smoke. The largest cancer risk is posed by Radon, a naturally occurring radioactive noble gas, which can penetrate from the underground into building through cracks. Building and fitting materials, furniture as well as cleaning agents enable so called organic volatile compounds - with Formaldehyde as the most common and known representative - to penetrate living and working areas. These can provoke nonspecific mucous membrane inflammations, headache, dizziness, lethargy and general indisposition.

Such disease symptoms are part of the daily life of Gerhard A. Wiesmüller of the University Hospital of Münster (Germany). He reported about the latest studies regarding the «sick building syndrome» (SBS), which was first observed in the middle of the 1970's as a so called building related health problem. A still unclear combination of physical, chemical, biological, psychosocial and person bound factors, causes a likewise unclearly defined disease, which shows irritations of the mucous membranes of the eye, nose and/or throat, skin irritations, as well as nerve complaints. The recent German «ProKlimA-Studie», which through a comprehensive survey of work places greatly added to our knowledge of this syndrome, also enables us to evaluate interiors and their environments in relation to SBS.

### **To get the pollutants and the risks under control**

From a scientific point of view today, indoor living space is a very dynamic system. As Tunga Salthammer of the Fraunhofer Wilhelm-Klauditz Institute in Braunschweig (Germany) puts it, volatile substances distribute themselves between a gaseous phase, a particle phase and deposited dust. This distribution depends on the saturation vapor pressure, and impacts accordingly the manner in which a person comes into contact with the material: through skin contact, hands in mouth, or inhalation. The actual exposition then is crucially dependant on the behavior and age of the persons affected, thus, for instance, infants, who creep on the floor, are clearly more endangered by substances present in house dust, than adults.

In order to minimize the risks posed by well-known pollutants in interiors, quality standards exist for the air in rooms. For their successful implementation three conditions are required according to Michael Pöll of the Office for Constructions of the City of Zurich, Sustainable Civil Engineering, Firstly, political commitment as well as financial and personnel resources. Secondly suitable instruments such as instruction manuals, recommendations and standards. And finally thirdly, the actual implementations and their control, for

instance by measurements, or by inspections of building sites as well. His conclusion: the system functions, as the example of Formaldehyde confirmed, however there still are present various problems: for instance, measuring techniques which are still very costly and too complex for many substances, or the slow classification of chemicals by the European Union. At the conclusion of the symposium, a lively discussion involving both specialists and interested laymen, and questions and comments from the attending public took place.

### Information

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Choice of paint and building materials can influence well-being in interiors.



Sudden black staining in new or reconditioned living areas, like here, over a halogen bulb, are puzzling and lead pretty often to discussions about their potential harm.