Electronic Nose

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The electronic nose is a technology that best exemplifies superior chemical sensory technology in combination with electronic signal imaging. The device has a pattern identification algorithm which allows the user to correctly identify a number of odors, vapors, and chemicals.

The act of olfaction is a complex process. It uses the largest portion of our brain. Many times our nose can keep us out of trouble, whether it be smelling sour milk or a nearby skunk. Some scientists had the idea to apply the useful abilities of olfaction. The e-nose can be programmed to detect any combination of chemicals that can be related to a particular smell. They can also be used to detect combinations of chemicals that are undetectable by the human nose. A common example is already in use for dangerous carbon monoxide, which can kill a person if contained within a space. It's common to find a device that detects carbon monoxide in our homes.

The e-nose is designed based on the human nose. The human nose uses the lungs to bring an odor to the epithelial layer. The electronic nose uses a pump to execute this same process. The human nose uses mucous and hairs to filtrate the smell. A certain combination of chemicals will produce certain electrical signals. The pattern of nerve impulses are propogated through neurons to the brain. The e-nose has a inlet sampling and filtration system that acts as the mucous membranes of the device. This enhances the selectivity of certain patterns of chemicals. The patterns of chemicals are picked up and the computer reacts to the created signals. When the polymer matrix picks this up, it expands, changing the resistance of the composite. This in turn, changes the electrical resistance read by the detector. A group of multiple composites can identify a multitude of chemical patterns and determine a specific set of signals. The amplitude is used to identify the amount of the substance. The sample is ready to be identified by the computer with some sort of identification algorithm. Both use ion currents and nerve voltage pulses to communicate olfaction.

There are seemingly endless applications to such a product. Instead of demanding farmers to keep their feeding procedures for there livestock as clean as possible, they can simply test the meat for certain forms of bacteria associated with mad cow's disease, and other forms of harmful bacteria. Grocery stores can use it to test the freshness of a variety of products. For example, olive oil grows odorous bacteria in special cases that could be identified if the e-nose is programmed to identify this specific bacterium. They can be designed to identify any odor, or in the case of CO, a non-odor.

Bandages have also been developed to identify that infections are occurring.

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