

Labthink Lab and Service-----Organic Vapor Permeability Lab

Abstract: this paper introduces the necessity of aromatic vapor permeability test and its testing methods, together with the functions and services of organic vapor permeability lab and the organic vapor permeability tests.

Key Words: aromatic vapor, barrier property, permeant amount, NON-FICK permeance, test

Aromatic vapor exists in food, medicine, cosmetic and diverse daily chemicals such as flavor snack food, distilled spirit, flavor, Chinese traditional medicine, plaster, perfume, soap, shampoo and so on. Different from inorganic gas and water vapor, most aromatic vapors are emitted by products themselves as well as the key quality and main function of those products (even the sole function). As to those products, the existence of aromatic vapor is very important. Dissipating or adding of aromatic vapor will affect the quality and marketing of products directly. So, kinds of aromatic vapor and maintaining of their concentration are important indexes of products quality measurement. However, aromatic vapor permeability test has always been a difficult worldwide problem. At present, Labthink Organic Vapor Permeability Lab is devoting to the test and R&D of organic vapor permeability testing.

1. Necessity of Aromatic Vapor Permeability Test

The odor and aromatic vapor mentioned in this paper refers to organic vapor of various kinds, which is different from routine aromatic compounds, and has close relationship with product quality. Sometimes they are the real "products". Instances are perfume, refreshing agent and so on, whose real "products" disappear as aromatic vapors dissipate. As for some medicines, effects lose as plaster smell disappears. As for flavor snack food, special product, smoke, alcohol and so on, sometimes they are key factors in selling. As for most cosmetics, sometimes the smells affect selling greatly. The above products can not be sold if their aroma disappears, despite perfect maintaining of their basic functions. Furthermore, those above-mentioned products have a common problem, that is, the affects of smell from outside the packages – slight permeance of peculiar odors may affect the smells inside packages, selling as well as usage of products. So we must select packaging materials with good barrier properties of aromatic vapor for those particular products so as to avoid emitting of aromatic vapor inside and permeance of peculiar odor outside.

2. Present Status of Aromatic Vapor Permeability Testing

In the process of aromatic vapor permeance through packaging materials, diffusion coefficient D and solubility coefficient S are affected by permeable matters in polymer, so it is NON-FICK permeance. The most prominent performance is the swellings in structure of polymer and other changes because of the reaction between permeable matters and polymers. As the lengthening of the permeance time, observed permeant data will separate from the predicted FICK curve further (whereas observed permeant data of FICK permeance fits predicted FICK curve well), as in fig 1.

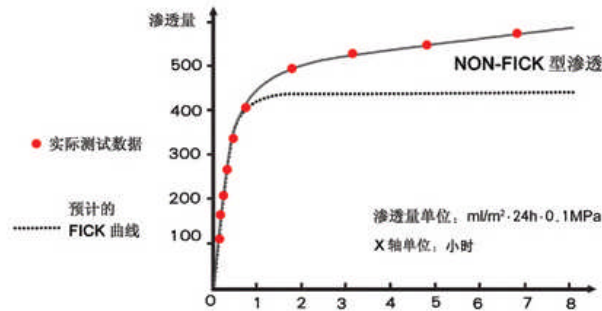


Fig 1 NON-FICK Permeance

Aromatic vapor permeability test is applicable to vapor permeability tests for plastic film, sheet and so on. The testing theory is: put specimen into permeant curve which is separated into two parts under a certain temperature. One side fills and keeps high concentration aromatic vapor; and the other side fills aromatic vapor of lower concentration with continuous airflow of carrier gas maintaining concentration difference between the two sides. Aromatic vapor that permeates through specimen to the side of low concentration brings away by carrier airflow. Testing system measures the content of aromatic vapor and computes permeant amount of aromatic vapor. Many other problems may occur during the test of aromatic vapor, for example, the reaction between aromatic vapor and flexible package in permeant process. Compared with gas permeance test and water permeance test, aromatic permeance test involves wider testing areas, such as barrier property tests, macromolecule materials and substance analysis. The aromatic vapor permeability test is more difficult than normal barrier property test in the establishment of testing method and development of testing instruments. Further more, deep theoretical basis of permeability and sufficient experiences of barrier property tests are demanded in research of aromatic vapor permeability and permeant test.

3. Organic Vapor Permeability Lab

At present, with the popularization of barrier property test and enhancement of attentions to product quality from customers and manufactures, there are urgent demands of barrier property test. Among them, the demands of aromatic vapor permeability test are fairly wide. Aromatic vapor may not metamorphose products and affect sanitation indexes, but it is a key factor of selling to many industries such as food, medicine, cosmetic, daily chemical and so on.

Labthink is the foremost international manufacturer of barrier property testing instruments of package materials and the first experimentalist of aromatic vapor permeability test. She is experienced in permeability test of routine gases and water vapor. Labthink always regards satisfying customers' needs and enriching advanced technologies as its aim. During the past decades, labthink devoted most of its human and material resources to researches of barrier property theories and testing machines. This lab not only develops series of barrier property test instruments, but also gets valuable result of data researching. At present, to meet the demands of aromatic

vapor permeability test from customers, Labthink has developed organic vapor permeability tester OPT-01 which could test the permeant amount of organic vapor such as benzenes, lipids, alcohols, aldehydes, ketones, and established organic vapor permeability lab to conduct the researches. The lab tests and services of aromatic vapor permeability are to improve the packages of products that have special demands for odors and control cost of packages by aromatic vapor permeability testing of packaging materials. The Organic Vapor Permeability Lab is now undertaking the project of organic vapor permeant amount test with testers developed by Labthink as well as researching and testing permeation mechanism of organic vapor to macromolecule polymer. Available schemes for testing and controlling as well as methods of quality control for packages such as food and cosmetic are expected to derive from the project.

4. Conclusion

The process of aromatic vapor permeating to package material is different from those of routine gas and water vapor. However, the permeant amount of aromatic vapor can be the key factor of products selling, and there is a rapid increase in aromatic vapor permeability test in the market. Labthink Organic Vapor Permeability Lab is engaging in researching and testing of aromatic vapor permeability from the very beginning of her establishment. Meanwhile, this lab provides testing services, and more supports for the packaging material selection and structure design with the requirement for odor preservation.