

Microwave Radiation in Analytical Chemistry

The exposure of chemical processes to physical fields is not a new trend in science. It will suffice to recall the use of ultrasonics or radioactive radiation. Among these fields, the use of microwave radiation has attracted the attention of analysts in recent years.

The first and most known application of microwave radiation in chemical analysis is the acceleration of sample decomposition, including those performed in autoclaves at higher temperatures and pressures. Such an application of microwave radiation became rather common. A number of companies, for example, CEM, Milestone, and others produce the corresponding equipment. Recently, researchers, especially Russian ones, began to study the mechanism of the action of microwave radiation first distinguishing its thermal and nonthermal components. Microwave radiation accelerates, sometimes significantly, the digestion of geological, biological, high-polymer, and other samples.

Another application of microwave radiation to chemical analysis that has not yet become a common practice consists in the acceleration of analytical reactions themselves, for instance, the acceleration of reactions between a metal ion and a reagent, and in the intensification of the preliminary preparation of analyt-

ical species that can participate in subsequent reactions. The latter, in particular, refers to the analytical chemistry of platinum group metals. These metals are characterized by slow conversion, especially in the case of kinetically inert complexes. The use of microwave radiation for the above goals in a flow (flow injection analysis and related methods) occupies a particular place.

One more application of microwave radiation is the preparation of adsorbents, extractants, and analytical reagents. The preparation of xerogels with immobilized reagents for test methods using the sol-gel technology and microwave radiation, which considerably accelerates the drying of gels, may be mentioned.

The applications of microwave radiation to chemical analysis were covered in many papers and two monographs in English, one of which was translated into Russian. In this issue of *Zhurnal Analiticheskoi Khimii*, some selected papers devoted to the use of microwave radiation in analytical chemistry are presented.

Yu. A. Zolotov