As it is shown on figure 2, warehouse and finance microservices are "boxed". It means that details of the realization of each service must be hidden. As the best practice, microservice must be represented to others services by API as the only way of communication.

Trends of Decentralization are seen in many modern software (eg Blockchain). So microservices tend not to have a common point of failure. It means that failure in some services must not lead to the collapse of the entire system. It is necessary that MSA is not located on a single platform (golden rule: one host - one microservice) and even in a single data center to avoid loss of the entire system efficiency due to the failure of some physical servers.

Losing datacenter is not the only one issue that can be faced in the process of developing microservices. The aim of a good architect is to create a stable microservices construction. When one part of the system works badly it should not affect the other parts. It is one of the advantages of using MSA, because failure isolation is almost impossible in monolith systems.

When MSA are splitted, decentralized and isolated it can be a nice bonus to be able to deploy microservices independently of each other. This provides a lot of advantages, but also imposes the obligation to provide the old API in conjunction with the new one because the other teams could not be ready for conversion.

Microservices imply facing a lot of mistakes during development. But in contrast to monolithic systems, it is not so bad in MSA, especially when system is ready for them. As it is described above, all failures should be isolated. But for the teams developing and maintaining microservices it is very important to recognize quickly these mistakes and react to them. In order to do it it is very useful to have well configured monitoring systems.

In the modern world more and more work is done by machines instead of people. The MSA system must be automatized as well. The more services we have, the harder it is to trace them. And this complex should be able to perform basic verification work without human attention. We must create a fully automated supervisor that controls the release of new version of the service to manufacturing and monitors it in order to reduce development costs and to free up as many resources as possible.

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AVERAGE POWER MICROWAVE PLASMATRON FOR SEMICONDUCTING MATERIALS REMOVAL

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The purpose of this paper is to review modern trends in semiconducting materials plasma processing, to show results of photoresist removal and describe microwave plasmatron used for such treatment.

Trends of microelectronics development are characterized by rejection of the wet-chemical etching applications during electronic components production. Dry plasma technologies are becoming universal and have virtually no alternatives. Currently big variety of devices based on microwave technology which allows for a large part of the integrated circuits fabrication processes to be realized has been developed. The microwave plasma discharge is an effective mechanism for transmitting of the electromagnetic field power in gas. Plasma processes are widely used for such purposes as etching of semiconducting, metal or dielectric layers; plasma nitridation or oxynitridation of silicon; cleaning of the wafers surfaces and many other applications [1].

Technological plasma for all above-mentioned processes is generated by plasma generators on the basis of an electric discharge in reactive gas. However, such a wide range of applications eliminates the possibility of all-purpose plasma chemical reactor creation. This factor stimulates the development of more efficient new devices able to show the results that exceed those provided by currently used plasma unit. An important task in the development of submicron structures plasma etching reactors is to provide high speed and selectivity of the processes along with the unit efficiency increase. It requires the forming of high density plasma capable of effective ion energy control. Combined dual frequency plasma discharges can be used for the functional separation of these processes. According to scientific and technical literature analysis the formation of combined plasma discharges is not fully studied which makes the investigation of electrical and technological characteristics of such discharges an urgent task.

When combined (MW+LF, MW+HF) discharges are used in surface treatment processes microwave plasma acts as a source of excited ions, free radicals and electrons which serve as a medium for the plasma formation under low-voltage LF or HF field influence. LF and MW plasmas have different discharge characteristics. Microwave (GHz) discharges provide reduced ion bombardment energy and necessary electron density. Microwave plasma is characterized by more active reaction with treated material; hence it has high plasma treatment efficiency. Low frequency (kHz) discharges have lower electron density and low level of reactive gas temperature [2].

Processing rate is one of the parameters that determine the effectiveness of plasma reactor. The investigation of material processing parameters was carried out with the average power microwave plasmatron that uses LF field formed in reaction volume for the ignition and maintenance of combined (MW+LF) discharge. This plasmatron is a part of plasma unit which was developed at the Department of Electronic Technology and Engineering and is used to conduct experiments on the etching of semiconductor materials.

Plasmatron consists of a ring resonator chamber with an axial cylindrical quartz tube. This tube volume is used as reaction chamber for plasma treatment processes. The resonator chamber is a rectangular waveguide with slots on its inner surface which was bent in ring. The upper end of the quartz tube is closed with a potential electrode, in the bottom part there is a grounded substrate-holder electrode which forms a low-frequency discharge system. LF power of the low-frequency generator in 15 – 40 kHz range is applied to the potential electrode. The source of microwave energy is a commercially available average power magnetron M-112 (≈600 W) with the operating frequency of 2,45 GHz. Microwave energy is fed into a ring resonator using waveguide section. Plasmatron design is shown in Figure 1.

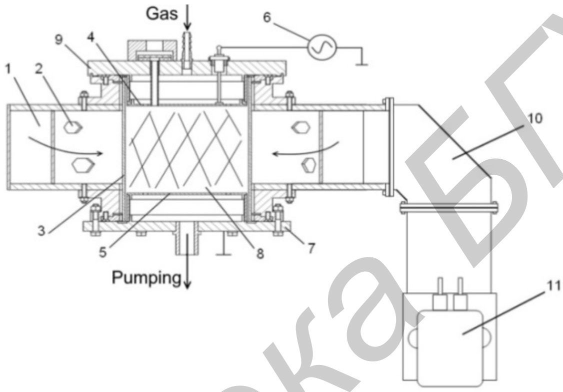

Figure 1 – The scheme of the combined discharge unit:
1 – waveguide; 2 – slot emitters; 3 – quartz chamber; 4 – potential electrode; 5 – grounded electrode; 6 – LF generator;
7 – bottom cover; 8 – plasma; 9 – removable top cover; 10 – waveguide section; 11 – M-112 magnetron

Experiments were performed in the pressure range of 120 - 170 Pa. The combination of MW and LF fields requires the use of optimum discharge power value that allows energy characteristics incorporated in the hybrid plasma to be provided. High value of the microwave power can lead to minimization of low frequency field impact on the processes taking place in working volume, and nullify the additional external energy stimulation of processes on the treated wafer surface. The electric field intensity of about 100 – 200 V/cm is required to excite a microwave discharge, and is already achieved with microwave power of more than 50 W in the resonator [3]. According to this, microwave power of about 200 – 300 W was used, which allowed observing the effect made by 100 – 150 W of LF power.

Photoresist SP-15 on the monosilicon wafers with a diameter of 76 mm was used as processed material. Reaction gas fed into chamber was oxygen. Samples were placed on the bottom grounded electrode. According to the results of the protoresist removal processes variation of the values of microwave power in the resonator and voltage on the potential electrode had significant impact on the rate of material removal. The comparison of the data with the results of photoresist treatment in microwave plasma indicates the process rate increase. Experimental data are shown in Figure 2.

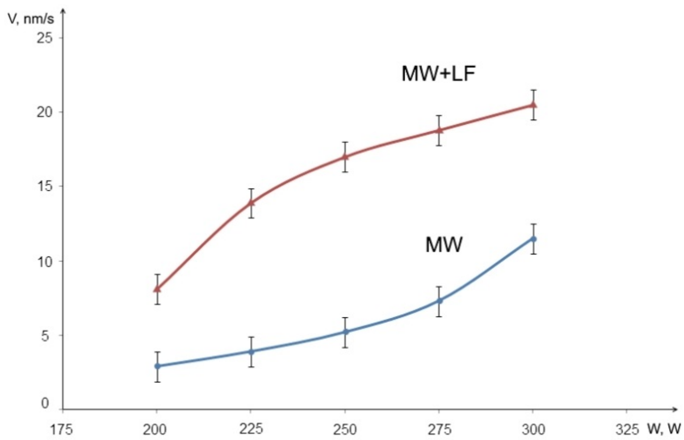

Figure 2 – The dependence of photoresist removal rate on the value of microwave power in the resonator

The effectiveness of the combined discharge was confirmed by conducted experiments. Further research of processes occurring in plasma, depending on the process parameters, system configuration and power source characteristics is required. This average power microwave plasmatron provides a high level of material processing quality in operations of the photoresist layer removal, as well as in mono- and polycrystalline silicon etching.

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SOCIAL NETWORKS: GOOD OR EVIL?

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What is the Internet? This is the global system of interconnected computer networks that use the Internet protocol suite to link devices worldwide. It is a network of networks that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. But what does it really mean for people? It is a chance to see the whole world in one click. This is an opportunity to get acquainted with people from other countries and to understand their culture and traditions. This is a place where you can realize yourself. And for some people it is their life.

Social network site or SNS is an online platform that is used by people to build social networks with other people in the Internet. Users create their profiles on the SNS in which they write about their hobbies, views, family, friends and so on.

The most popular social networks are:
- Facebook
- Twitter
- Instagram
- Ask.fm
- VKontakte or VK
- Odnoklassniki

Social networks become an important part of our everyday life. People chat, maintain blogs, upload photos, read news. Do you know that the average user spends about 6 hours a day in the SNS? This is about 3 months a year! So why do people do that?

Social networks give us a possibility to communicate with colleagues, relatives and friends living in different cities and countries and also make new friends.

It can be used for self-development. You can watch educational films, listen to good music, read interesting books and learn foreign languages. There are groups of interests, where you can find information you need, such as a video with fitness classes or with guitar lessons.

Social networks can also help you in education. With the help of Social Media you can share lecture notes, assignments for laboratory works and find useful information.