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## Future Perspectives of Nuclear and Radiochemistry Education in the New Era of the Silk Road According to Chinese Nuclear Energy Development

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The training of qualified workers through the peaceful development along the New Silk Road is one of our tasks, since our Lab. is located in the capital of Gansu province, Lanzhou, which is now as then located at the Silk Road and closely related to it's development. But, what does nuclear mean? This question can be answered in different ways. In the past, nuclear meant armament, threats and similar things. But in the future, nuclear will stand only for peaceful and sustainable energy. Therefore, I will look about this issue from the perspective of the development of the Silk Road. In Chinese writing, there are two characters which sound alike, but mean different things. But the fact, that they sound alike, demonstrates that they are somehow related, anyway. So, for me, in Chinese language, nuclear energy means peace through development. And that has been, after all, the fundamental idea of the Silk Road in the past, and that is what it will be in the future.

### I. CHINA'S FUTURE PERSPECTIVE

There are presently 35 nuclear power plants at 11 locations. Another 28 Gigawatts are under construction, and until 2020, 58 Gigawatts will be online. And, they shall not be built along the eastern coast of China, but more and more in the interior parts of China. In this endeavour, all work is aimed at an peaceful and sustainable development of nuclear power in China. Thus, the percentage of nuclear power in the production of electricity will be expanded to 4% by 2020, to 10% by 2035 and, together will renewable energy, to 30%, by 2050. To reach this aim, China needs to build and develop more nuclear power plants.

But, first of all, I want to show why we did choose nuclear energy:

- because we have to re-evaluate, for a number of reasons, coal as an energy source;
- because we do not want to create a conflict, between economic growth and the environment;
- because we will be more able to even out energy prices;
- because we want to overcome the limitations of other energy sources in regards to the availability of resources and their compatibility with the environment;
- because the development of nuclear energy serves to boost productive powers, especially in the area of nuclear power technology.

The challenges we are confronted with, in this endeavour, are

- the safety of the installations;
- the protection of the installations against terrorism as well as the emission of dangerous substances; - the handling of radiation products;
- economic competitiveness;
- as well as sustainability.

But, aside from these general challenges we are confronted with, there are some challenges that are specific for China. Among these, there are:

- the availability of nuclear materials and resources in this area;
- competitiveness in the construction and installation of nuclear power plants;
- our own capacities for innovation in nuclear technologies;
- the construction of nuclear power plants in the interior parts of China;
- and the training of skilled workers in the area of nuclear technology and nuclear chemistry.

This last challenge for China, concerning the training of skilled workers in the area of nuclear and nuclear and radiochemistry, is a task of our university of the city of Lanzhou, which is located at the Silk Road. How important this area is for China, today, is demonstrated by a look at the past, the present and the future of

nuclear and radiochemistry in China.

1895-1942 - The first steps: founding of radiochemistry education and research in China;

1942-1986: Golden Era: construction and use of nuclear technicians;

1986-2000: Decay;

2000-2011 Renaissance: of nuclear technicians as well as nuclear and radiochemistry;

2011-?: Fukushima After the incident in Fukushima, it was, at first, not clear how China would proceed, and if China would stick to its plans. Therefore, there were intensive discussions among specialists. They arrived at the conclusion that China will continue to develop its nuclear energy.

## II. CURRENT TRAINING IN NUCLEAR AND RADIOCHEMISTRY

While in the last century, our universities hesitated and in some cases stopped some nuclear programs, we have now restarted programs in the areas of radiochemistry, nuclear technology, nuclear physics, nuclear medicine etc. Similar developments occur at a number of institutions outside of universities. We have to recognize, that the number of nuclear workers needed depends on how many nuclear power plants are in use. Therefore, it is clear that a faster development of nuclear sciences and radiochemistry will enlarges the labour market for skilled workers, there will be a greater demand for skilled workers, and this creates a challenge, whether we will be able provide for this demand. The areas of skills that are affected by this are planning, construction and running of nuclear power plants and the nuclear fuel cycle. If China is to provide for this demand, this would require that the number of skilled nuclear workers rises to 25.000 until 2020.

But not only in nuclear technology and nuclear physics, chemistry, we will need skilled workers, because of these development plans, but also in areas like finances, law and protection of the environment.

Thus, the challenge is:

- to provide for the needed skilled workers;
- the lack of teachers;
- laboratories are too old and badly equipped;
- there is not enough done to attract students.

Political decisions can liberate all subordinated institutions. We will need decisions by the People's Congress, to provide for a long-term financing for these programs.

Progress that has already been made:

- The government has decided in favour of a sustainable financing for training programs in the areas of nuclear technology and nuclear physics;
- companies get involved and share their facilities with universities;
- universities work to renew their departments and equipments.

## III. CONCLUSIONS

Concluding, I can say that the peaceful use of nuclear energy along the Silk Road will enhance the training of skilled workers in the areas of nuclear and radiochemistry. Chinese people love and hope to set up a peaceful world. We should ensure peaceful use of nuclear energy. We hope everyone in the world enjoy the peaceful development.

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