The Necessity of Talent Training on LED Related Specialty in Higher Vocational Colleges in Nanchang City

Hai Kuang\textsuperscript{1,a}, Shi-an He\textsuperscript{2,b}, Ping Chen\textsuperscript{3,c}

\textsuperscript{1,3}Jiangxi Science and Technology Normal University, Nanchang, Jiangxi, 330038, China
\textsuperscript{2}Jiangxi Changyun Company, Nanchang, Jiangxi, 330038, China
\textsuperscript{a}haizi411@126.com, \textsuperscript{b}157898982@qq.com, \textsuperscript{c}466307938@qq.com

Keywords: LED; Personnel training; Necessity

Abstract: Aiming to develop the LED industry in Nanchang, the present situation and the problem of development in LED industry were studied. And the status of talent training in LED industry of Nanchang was briefly introduced. The significance of talents training on LED related specialty in Nanchang was analyzed. Combining with the characteristics and advantages of the development of Nanchang, the solution was proposed. In corporation with related enterprise, the reform of colleges would be accelerated. This is beneficial for students and teachers. It is a solution for lack of LED professionals in turn.

Introduction

The semiconductor light emitting diode (LED) appeared in 1962. Then the technology of LED on sapphire substrate had a breakthrough in Japan in 1993. In 1995, a LED on silicon carbide substrate was successfully developed. LED is known as the 4th light source for its advantages. At present, 80% LED are made in China, but most of the key technologies on LED were invented in Japan and the United States. Nichia, Toyota, Cree, Philips and Osram formed a strong patent alliance. In recent years, Japan, South Korea and several countries in Europe use special funds to support various industry organizations, universities and enterprises to develop LED industry. In 2004, technology of LED on silicon substrate made a breakthrough by Jiang Fengyi in Nanchang University. And China became the third country in the world after Japan and the US who master the technology on blue LED. Lattice Power Limited Company (Jiangxi) was set up in 2006 to study the production of LED on Si substrate. The company produced little power LED in quantity production in 2009. Then the high light LEDs were produced in quantity in 2012. After that, Nanchang became the only city in the world where substrate LED chip were produced in large quantity. At present, the electro optic conversion efficiency of LED on silicon substrate is more than 60%. 147 patents have been obtained and 47 among them are international patents. This stands for the maturity of technology of LED on silicon substrate. However, compared with the other two technical routes, development of LED on Si substrate faces challenges. In 2015, the overall value of China's semiconductor lighting industry reached ¥ 424.5 billion, but the domestic LED enterprises generally lack of core technology. So it is difficult to further develop. There were thousands of factories in failure in 2015. The shortage of professional talents on LED has seriously restricted the development of LED industry.

The status of talent training on LED

In Nanchang, now more than a dozen families of industrial clusters based on technology of the LED on silicon substrate are built, covering the field of epitaxial wafers, chips, packaging, etc. In 2015, the output value of LED in Nanchang was more than ¥5 billion. Nanchang is one of the three major occupation education bases. There are 670,000 students related on LED in Nanchang in 2015. Among them, there were 550,000 studying in colleges and universities and 120,000 were in other school such as technical schools and occupation high school. This can train talents for the development of LED industry in Nanchang city. Due to the technology of "LED on silicon substrate ",

230
Nanchang has become a relatively strong industrial base and has formed a more complete industrial chain. In 2015, the teams of Jiangfengyi win National Technological Invention. Based on this, the Jiangxi governments made a plan for developing LED industry. They want to develop Nanchang as a new Optics Valley. This would lead to the change of current station of LED industry in our country, reshaping the global industrial structure.

Due to the low starting point and short development time, it is insufficient in talent training on the LED related professional personnel in Nanchang city, restricting the development of LED industry. Some scholars\textsuperscript{[1-2]} believed that the lack of a group of excellent LED production technology and industrial development of management personnel Nanchang city was obvious. There were only a few LED field research platform stay in Nanchang city. Furthermore, research institutions and universities were not enough. The talent training system training for LED in school has not formed. These views reveal the problems existing in the training of professional talents of LED, but a special and systematic research and suggestions have not been make. Researchers\textsuperscript{[3-4]} took proposals for this situation. First, the introduction of high-level personnel of LED foreign would lead new station of LED industry. In addition, it is necessary to develop higher occupation education. It is an important platform to cultivate innovative high quality LED spillers. And it is also an important index for regional construction industry cluster of LED. Someone thought it should be trained in local, basing on the current research conditions and research platforms. It would benefit for the development of LED industry in Nanchang city. The representative views\textsuperscript{[5-6]} showed that professional training on LED in Nanchang has attracted much attention from academia and research areas. But the content of the study is still at the low level and should be studied in further. There are mainly 4 shortcomings as following:

1. Most of the studies are macroscopic and general, not thorough enough;
2. There are only a few researches on LED professional talent training. It is not systemic and difficult to get breakthrough.
3. The problems and countermeasures studied are not specific. This is not practical.
4. The researches on market mechanism and macro-control role are not enough.

**Necessity of talents training on LED**

How to make the program to meet talent demand for developing LED industry in Nanchang based on the enterprise is important. Providing scientific decision-making basis and reference for teaching and reform of cultivating talents in Higher Vocational Colleges in Nanchang city becomes the key problem.

**The content of essential research on LED talent training**

The characteristics and insufficiency of development of LED industry should be researched effectively. Relying on the current status of LED business, the problem would be studied. The law and cause will be explored. The necessity should be demonstrated. The professional construction of ideas and training system could be analyzed.

According to the status and law of professionals on LED, the personnel training system ought to be proposed. The significance of talents training on the development of economic needs to be studied\textsuperscript{[7]}. According to the new training plan and relying on the industry, training talents development and training mode innovation are researched.

Researching on the trend of the development of social demand change and strengthening practical ability training based on the enterprise is importance. This could promote the teaching and reform of other subjects. According to the policy and the need of local economic development, the diversified LED professional talents education pattern should be explored to meet the social demand for development of LED.

**The significance of LED talent training**

The training on LED talents in local can meet the social demand for talent. That is important for the entire industry and economic development. Professor Jiang\textsuperscript{[8]} leads a domestic first-class research team in Nanchang, which is good at researching. But in the process of industrialization of LED on Si substrate, the lack of a large number of LED professional technical and management
personnel limited the development of LED industry. The talent can’t meet the demand in market. Nanchang city is lack of competitiveness in terms of wages and benefits for the introduction of a single external talent. Taking the advantages of higher occupation colleges and combining its own characteristics and the actual use of educational resources in Nanchang city, LED related professional should be encouraged to set up in colleges and universities. The pressure of talents would be alleviated by establishing the training system and strengthening personnel training and personnel training output. The development of the industry would be promoted.

It is conducive to take advantage of the technology of LED on substrate to innovative LED related personnel training model and explore the mechanism of professional personnel training. Make full use of a number of to establish the teaching practice base in colleges is encouraged. The new knowledge and new technology can be lead into the classroom. The enterprises and factories can collaborate and have a win-win station.

The solution for development of LED industry

As one of industry base for LED, the shortage of professional talent on LED in Nanchang restricts seriously the development of LED industry and even economic development in Nanchang. Now there are only a few doctors and masters in LED enterprises as employees in Nanchang. The majority of employees are technical personnel, lacking of professionals in production line. It should to take advantage of the high level of higher vocational education in Nanchang city to encourage related vocational colleges to setup LED related professional and cultivate local talent. It would be helpful to ease the pressure of talent and is good to promote economic development. There are many high level enterprises in Nanchang, such as lattice Power Company and LianChuang Company. High-tech and new knowledge can be introduced to higher vocational colleges. The reform and development of practical teaching could be strengthen.

The skill training and the post professional construction and enterprise development should be in synchronization. Training objectives ought to meet the requirement of enterprises. And the occupation literacy could adapt to the enterprise culture. In accordance with the "three synchronous adaptation", the higher vocational colleges can cooperate with related factories. Teachers and workers can discuss the problem of LED industry. Taking the advantage of LED industry and related businesses in Nanchang city, the personnel training mode relying on "project teaching," would be studied.

Setting up LED related major in higher vocational colleges is an effective way to alleviate the pressure of talent to achieve sustained economic development. It is also helpful to promote the reform and innovation for vocational training. Exploring new education and training system is importance.

Conclusion

LED has attracted much attention. But the lack of core patents and the lack of relevant professionals in Nanchang city limit the development of LED industry. The core technology of LED silicon substrate has made a major breakthrough. It is good for the development of Nanchang. Now Nanchang city has been one of the important bases for LED. But training for professionals of LED is not enough, restricting the further development of the industry. Take the advantage of good developed LED industry and large number of high-level higher vocational schools in Nanchang city; it is encouraged to set up majors for LED professionals in colleges and vocational schools. In cooperation with the LED factories, new knowledge and new technologies could be introduced to student. That is good for the reform of training model in schools. The training mode in higher vocational schools would be improved and updated in time. This is beneficial for students and teachers. It is a solution for lack of LED professionals in turn.
References