Job opportunities in material(s) technology

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Some of first graduates Material Technology Program UMP. All 45 graduates have got jobs soon after graduation 2016

Materials are substances of universe which have properties that make them useful in structures, machines, devices, products, and systems. There are three closely connected areas of study related to materials, namely material(s) technology, materials engineering and materials science. Material(s) technology is a relatively comprehensive discipline that begins with the production of goods from raw materials to processing of materials into the shapes and forms needed for specific applications [1]. Material(s) technologists work with materials such as metals, plastics, rubbers and ceramics. They study how the composition, structure, processing, and application of these materials, are inter-related. On the other hand materials engineering "deals with the synthesis and the use of knowledge (structure, properties, processing and behavior) in developing, preparing, modifying, and applying materials to a specific needs" [2]. Materials engineers are concerned with the processing and application of specific materials, but also need to understand their composition, structure and properties. The knowledge of structure, properties, processing, and behavior of materials is covered in materials science study. A material scientist considers structure and properties of materials, and how these are affected by composition and/or processing. Therefore, materials technology, engineering, and science connect to - and influence - each other regarding with products, processes, and properties, respectively.

Based on Malaysia Plan [3], industry is categorized into 4 sectors namely agriculture (including forestry, fishing livestock), mining, manufacturing, construction and services. Eleventh Malaysia Plan 2016 - 2020 has projected a total of 1.5 million jobs are estimated to be created mainly in the services (76.5%), manufacturing (21%), and other construction, agriculture & mining (2.5%) sectors. In the manufacturing sector, most of jobs is allocated into three subsectors: chemical, electrical & electronics (E&E), and machinery & equipment (M&E). While services are classified into subsectors of: electricity, gas & water; wholesale & retail trade, accommodation & restaurant; transport, storage and communications; finance, insurance, real estate & business services; government services; and other services.

In line with Malaysia Plan, Malaysian Investment Development Authority (MIDA) 2015 [5] reported that the projects approved in 2015 were expected to create 66,494 employment opportunities primarily on the E&E subsector such as semiconductor, light emitting diodes, solar and industrial electronics (22,599 jobs), followed by rubber products (6,890 jobs), fabricated metal products (4,526 jobs) and plastics products (3,863jobs). It was projected by 2020 that those subsectors are expected to drive the biggest growth and will contribute a projected RM90.1 billion to Malaysia's GNI and 157,000 jobs. The next opportunity is in the chemical subsector which recorded a growth of 3.4% per annum. In this subsector, colloid chemistry is vitally important to fast growing manufacturing industries such as automotive, E&E, pharmaceuticals, and construction which provided an estimated 348,000 new job opportunities for categories mainly in the managerial, technical, supervisory, and skilled.

Then, in what kind of jobs do the material(s) experts play the important role in those area/subsectors? Board of Engineers Malaysia (BEM) together with Institutes of Engineers Malaysia (IEM) and Federation of Engineering Institutions of Islamic Countries in their *The Engineering Technology Path* in 2003 [5] stated that any design and development of tools, equipment, microelectronics & IC packaging and civil construction need materials engineers for improving the strength, corrosion resistance, fatigue resistance, and other characteristics of frequently using materials. Materials engineers also involved in selecting materials with desirable mechanical, electrical, magnetic, chemical, and heat transfer properties that meet special performance requirements.

Unlikely with materials engineers, material(s) technologists are mostly close to the end products activities, they are needed to work in: research and development; production management; quality control; purchasing; sales and marketing. Material(s) technologists are employed in wide range of industries including in production and fabrication of metals,

Industrial Visit - Students of Material Technology Program UMP to Norimax

Table : Jobs vacancy for some area

Location/ Vacancy	Engine-ering	Materi-als	Ceram-ics	Semico-nductor	Poly-mer	Compo-site	Corro-sion	Metal	Charac-teriza-tion	Elec-tronics	Mecha-nical	Oil and Gas	All
Johor	663	336	6	21	7		1	58	2	244	271	53	2294
Kedah	136	62		30	4			5	6	58	45	1	416
Kelantan	27	7		3	1			1		9	10	1	134
Kuala Lumpur	986	564		19	4	1		18		328	182	112	7822
Labuan	15	4		3						4	5		57
Melaka	138	61		61	2			8	1	63	60	4	545
Negeri Sembilan	129	59		22	11	8		5	3	46	50	8	466
Pahang	89	36		3	1			1		18	30	8	351
Penang	884	380	1	184	10			54	23	637	357	5	2620
Perak	139	67		19	2			6	3	51	68	4	539
Perlis	17	6		3	1			1		6	5		78
Putrajaya	43	23		3				2		12	15	2	199
Sabah	41	25		3				1		25	14	2	291
Serawak	81	34	1	7				2		24	26	4	376
Selangor	1602	854	4	46	18	2	1	87	2	575	558	88	8372
Terengganu	34	15		3	1			1		9	12	6	133
Total Malaysia	5024	2533	12	430	62	11	2	250	40	2109	1708	298	24693

Source: Jobstreet.com January 2017

polymers, ceramics, composite, and semiconductors. They can also work in other area: electronics; telecommunication; construction; consumer goods; packaging; oil and gas; and biomedical industries. requirement.

The above table illustrates the recent jobs vacancy posted by Jobstreet.com [6], the biggest jobs provider in ASEAN countries, as of 19th January 2017 at each state/ area in Malaysia. Jobstreet.com spreads into 16 areas, namely Johor, Kedah, Kelantan, Kuala Lumpur, Labuan, Melaka, Negeri Sembilan, Pahang, Penang, Perak, Perlis, Putrajaya, Sabah, Serawak, Selangor, and Terengganu. The vacancy illustrates the job in the following areas: engineering, materials (including ceramics, polymer, composite, semiconductor, metal, material chacterization), electronics, mechanical, and oil & gas. Total jobs posted at 19th January 2017 for whole Malaysia is 24,693. Engineering field occupies 20% jobs and 50% of them is related with materials field. In addition, semiconductor and metal dominate the materials jobs and explicitly mentioned in the job

The role of jobs related to materials are vary significantly, such as a materials production planning and control (86% of jobs) which ensures materials availability with optimum stock level in the production line followed by material lab specialist (7% jobs) operates all lab equipment to perform material test/ analysis as requested according to operating/procedure condition or specific request, and other jobs such as lab supervisor which conducts reliability test in aspect of color, corrosion and mechanical properties, etc. In the semiconductors area, the vacant jobs need such as experts in process integration, failure analysis, system specialist, test specialist, thin film specialist, and other sales and marketing post. Mostly the jobs are closely related with end products and how the starting/raw materials are available in all sections in production line. Materials selection, testing, planning & control dominate the jobs specification posted in Jobstreet.com. Such kind of activities are closely to the study of material(s) technology. Therefore, materials technologists should play the important role in industries in Malaysia. Whenever jobs are posted and request materials specialists, actually by referring the jobs specification, material(s) technologists are strongly invited to apply.

Communitizing Material Technology to Kolej Matrikulasi Pahang (KMPh) students at UMP Gambang

References

[1] http://www.ntnu.edu/mse/about-us/what-is-materials-technology

[2] National Research Council. Materials Science and Engineering for the 1990. Washington D.C.: NRC, 1989

[3] Eleventh Malaysia Plan 2016-2020

[4] Malaysian Investment Development Authority (MIDA), Malaysian Investment Performance Report 2015

[5] Engineering Technology Path, Board of Engineer Malaysia, 2003

[6] Jobstreet.com, 19th January 2017

Notes:

The authors are staffs at Material Technology Program, Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang (UMP). The Material Technology Program has just been visited by MQA member for accreditation process. The first graduation of this program was in September 2016 and 100% graduates have been employed. More than 60% the graduates work at the subsector of electronics/semiconductor. It has shown that graduate employability is very high soon after graduation. The other factor of the acceleration of employability is that the program offers the 4th year students for 6 months industrial internship (LI). During LI, student will learn practically and apply what he/she has studied during 7 semester in the university.