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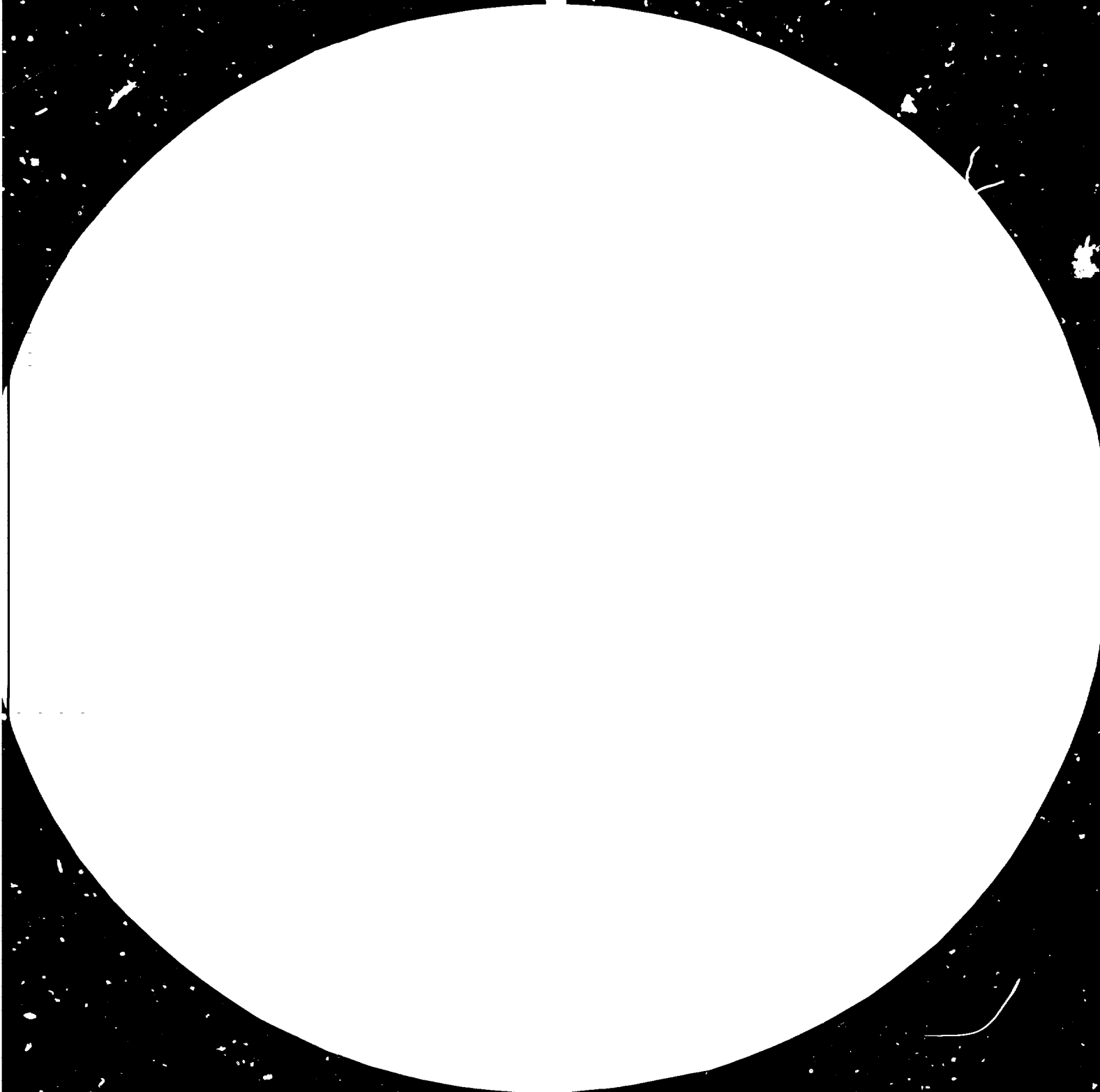
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METALLURGICAL RESEARCH AND DEVELOPMENT
ACTIVITIES IN THE REPUBLIC OF KOREA*

by

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The Korean economy has grown remarkably in last twenty years. Per capita GNP has increased from US\$107 in 1963 to US\$1,597 in 1979, while export has grown from US\$86 million to US\$15 billion in 1979. The economic growth has been achieved mostly through rapid development of manufacturing industry. The industrial development has been possible mainly through imported facilities and technologies. The Korean industry now faces challenges of transformation and adjustment from quantity growth to quality improvement.

During the period of economic growth the Korea Institute of Science and Technology has played the leading role in technical development and in major industrial planning for the government, since it was found in 1966. Most of its senior staff were recruited among highly trained Korean scientists and engineers abroad. In 1981 the Institute was merged with the Korea Advanced Institute of Science, which was an engineering graduate school. The amalgamated institute is now called as the Korea Advanced Institute of Science and Technology. The new institute retains most of former functions of industrial research and of post-graduate teaching and research.

Although a few more metallurgical research laboratories have been established in recent years, they are in developing stage in terms of qualified staff and facilities. The Metallurgy and Metallurgical Engineering Research Division of the Korea Advanced Institute of Science and Technology is still considered as the Metal Industries Development Center in Korea. A list of main facilities of the Division and the related field is as follows :

Induction melting furnace
Vacuum induction melting furnace
Vacuum arc melting furnace
Forging hammer
Laboratory rolling mill
Hydraulic press, 650 ton
Draw bench
Various furnaces
Transmission electron microscope
Electron microprobe analyzer
Instron universal testing machine
Fatigue testing machine
Creep-rupture testing machine
Hardness tester, various
Metallurgical microscopes
Sample preparation apparatus for metallography
Dark room facilities for metallography
X-ray diffractometer
Differential thermal analyzer
Infrared image furnace
Stress corrosion tester
Spectrograph
Gas analyzer
Cupola
Medium and high frequency induction melting furnace
Crucible melting furnace
Molding machine
Foundry sand testing machine.

Most of the facilities was set up ten years ago and there has been no major purchase since then. The diversified

activities of the Division demand more equipments. Replacement or major refitting of some old type equipments will improve the capability and efficiency the Division.

The related fields with the Division are Foundry Technology Center and Technical Service Division which includes material testing, chemical analysis and workshop. The Foundry Technology Center was established to promote Korean foundry industry by information dissemination, technical service and some training activities combined with research and development.

The main research and development activities are centered in the Metallurgy and Metallurgical Engineering Research Division of the Korea Advanced Institute of Science and Technology. The Division is currently carrying out several industrial contract researches from Korea's leading metallurgical industries. A few examples of them are development of dual phase steels, study of Hi-B grade silicon steels, thermal resistant aluminum alloy conductor, and samarium cobalt magnets.

The current trend and future plan of the Division's research are for the more medium and long range projects of the industrially oriented basic research rather than short term projects. Some of Korean metallurgical plants have grown enough to have their own research or testing laboratories and other smaller government sponsored metallurgical laboratories are developing to cope with immediate industrial needs. The following research topics of the Division in 1981 may demonstrate the current trend of government sponsored research as well as representative research areas which interest Korean metallurgists as a whole.

1. Simultaneous dephosphorization and desulfurization of liquid pig iron by flux of calcium oxide system.

2. Simultaneous dephosphorization and desulfurization of molten pig iron by sodium carbonate.
3. Effect of sulfur content on the sulfide shape control in steel.
4. Formability of permalloy alloy.
5. Reliability improvement of welded high strength steel structure.
6. Fracture toughness and delamination in high strength low alloy steel.
7. Development of chrome-cobalt-iron permanent magnet.
8. Amorphous magnetic alloy development.
9. Al-Fe-Co electrical conductor alloy with acceptable strength and ductility.
10. Development of high tungsten nickel-base superalloy for pipe materials of ultra-high temperature use.
11. Development of bio-metallic materials.
12. Fabrication of WC-Ni cemented carbide alloys with TiC and TaC addition.

Metallurgists in the Korea Advanced Institute of Science and Technology are making sincere efforts in organizing and carrying out the contract research from industries while formulating the medium and long range projects for future. The gradually increasing demand for technical innovation from Korean metal industry will hopefully turn the long range projects into practical uses perhaps in later half of the eighties.



