

The 1977 Kirkpatrick Chemical Engineering Achievement Award

RHODIUM CATALYST USED IN ACCLAIMED INDUSTRIAL PROCESS

The coveted Kirkpatrick Chemical Engineering Achievement Award has been won this year by the presentation submitted on behalf of Union Carbide Corporation, Davy Powergas Limited and Johnson Matthey and Co Limited. This biennial award, sponsored by *Chemical Engineering*, was inaugurated in 1933 to honour outstanding group achievement in chemical engineering. At what was a most difficult time for the chemical process industries the late Dr. Sidney D. Kirkpatrick, appreciating that mankind would not benefit from the many new ideas being advanced until they became commercially successful, worked unstintingly to stimulate and publicise creative advances in chemical engineering technology. He developed the idea of an award which would recognise outstanding work in this field and add to the prestige of the group making the most significant contribution. The award quickly achieved its objectives and, most appropriately, was renamed in his honour in 1959.

The difficulty of the chemical engineering problems encountered and solved, the novelty of the technology employed and evidence of commercial success within the last two years are the criteria used for selecting the award winner. From the five finalists the 1977 Board of Judges, all distinguished professors selected from the chairmen of accredited departments of chemical engineering at universities in the United States of America, has chosen as the winning submission the new low pressure oxo process for the production of butyraldehyde from propylene and synthesis gas.

The detailed story of the award winning achievement has recently been published by the sponsoring organisation (*Chem. Engng.*, 1977, **84**, (26),

109-115) while an article in a previous issue of this Journal discussed the principles of the oxo reaction on which the process is based and also outlined the new technology required to transform this exciting idea into commercial reality (*Platinum Metals Rev.*, 1975, **19**, (3), 93-95).

The award winning group of Union Carbide Corporation, Davy Powergas Limited and Johnson Matthey and Co Limited have together succeeded in commercialising their new process, which overcomes the disadvantages of the established cobalt-catalysed process. These are the low ratio of *normal* to *iso*-aldehydes obtained and the relatively high pressure at which the reaction takes place. An essential difference between the two processes is the use of a patented phosphine-modified rhodium catalyst instead of cobalt.

Although both processes aim to produce the more useful *normal*-butyraldehyde some *iso* is also obtained. However, a very important feature of the new process is its selectivity; it yields a considerably larger proportion of the required *normal* product. In addition the new process works at a significantly lower pressure than the old, a factor which reduces both capital and maintenance cost and increases reliability. The first commercial plant utilising the new process was started up at the Union Carbide complex at Ponce in Puerto Rico in January 1976. Further plants based on the award winning technology are also under construction, and others are being planned, in the United States of America and in Europe.

At a time when higher quality and lower costs are increasingly important it is encouraging to find that the industries based on chemical engineering technology can combine, internationally, to satisfy the needs of society.