Macromolecular chemistry is a relatively young science. Though natural and synthetic macromolecular substances had long been known, it was only between 1920 and 1930 that Hermann Staudinger placed our knowledge of the chemical structure of several macromolecular substances on a scientific basis.

(...) The achievement of these results has also been helped by the research I did in 1924 when I was a trainee student under the guidance of Professor Bruni. At that time I began to apply x-ray study of the structures of crystals to the resolution of chemical and structural problems.

(...) In view of the experience I had acquired in the field of chemical industry, certain Italian Government and industrial bodies entrusted me in 1938 with the task of instituting research and development studies on the production of synthetic rubber in Italy. Thus the first industrial production of butadiene-styrene copolymers was realized in Italy at the Ferrara plants, where a purely physical process of fractionated absorption was applied for the first time to the separation of butadiene from 1-butene.

At that time I also began to be interested in the possible chemical applications of petroleum derivatives, and particularly in the use of olefins and diolefins as raw materials for chemical syntheses such as oxosynthesis and polymerization. The knowledge acquired in the field of the polymerization of olefins enabled me to appreciate the singularity of the methods for the dimerization of \( \alpha \)-olefins that Karl Ziegler described in a lecture delivered in Frankfurt in 1952; I was struck by the fact that in the presence of organometallic catalysts it was possible to obtain only one dimer from each \( \alpha \)-olefin, while I knew that the ordinary, cationic catalysts previously used yielded complex mixtures of isomers with different structures. At this time I also became acquainted with Ziegler’s results on the production of strictly linear ethylene oligomers, obtained in the presence of homogeneous catalysts.
Today:

More than 110 PP licensed plants

1960 - 1980

1982 - 1994

High Yield - High Stereospecificity
Phthalate ZN Catalysts

Diether & Succinate
ZN Catalysts

1995 - 2003

Low Yield - Low Stereospecificity

Spherizone - PP

TODAY:

More than 110 PP licensed plants
The product applications
ITALY
LyondellBasell in Ferrara

- **R&D**
  - Pilot Plants
  - Laboratories

- **CATALYST MANUFACTURING**
  - Catalyst
  - Support

- **POLYMER MANUFACTURING**
  - Polypropylene
  - Catalloy

**Shared Services** (HSE&Q, HR, Administration, ...)

The Company evolution in Ferrara (from 1950 until today)
History of Ferrara Site

On March 11th 1954 G.NATTA (Nobel Prize winner in 1963) wrote on his agenda: “Polypropylene made”

1942 Ferrara complex started up by SAIGS (Synthetic rubber)
1950 Montecatini takes over the complex (Fertilizers and Petrochemical products)
1957 The first industrial PP plant in the world came on stream in Ferrara
1962 Monteshell (Montecatini & Shell JV) took over the petrochemical activities of the Site
1962 – 1982 After significant restructuring steps, the Site is controlled by Montedison producing Polyolefins (Montepolimeri), Ammonia & Urea (Fertimont) and R&D facilities with a strong focus on Polyolefins field
1983 Establishment of Himont (Hercules & Montedison JV)
1995 Establishment of Montell (Montedison & Shell JV)
2000 Shell and BASF put together their Polyolefins businesses merging Montell - Elenac - Targor into BASELL
2005 Access Industries acquire Basell
2007 Basell & Lyondell merging
LyondellBasell in Ferrara

Catalloy plant
PP plant
Catalyst plant
Pilot plants
Monomers Storage
Warehouse

Polymer manufacturing
R&D and Catalyst
Giulio Natta Research Center in Ferrara has been active in the Polyolefins since 1950, producing revolutionary catalysts, processes, products and applications.

The Center has about 500 researchers, the majority being high school graduates and more than 150 University graduates in chemistry, physics and engineering.

A unique feature of the Center is that the catalysts development and production plants are in the same area and fully integrated with the Research activities.
MISSION

* To conceive, identify and transfer innovative technologies for the production of polyolefins on industrial and commercial scale.

* To investigate, implement and commercialise new: Catalysts - Processes - Products.

* To guarantee and provide technology transfer and technical assistance for the production plants of both LBI and Licensees.

* To provide the customers the most reliable and timely response to all application problems by qualified research personnel.
“G. Natta” R&D Ferrara: A history of ‘firsts’

- 1953 Ziegler Natta catalyst discovery
- 1957 1st PP Slurry Process
- 1960 HDPE- Slurry Process
- 1962 C2/C3 Rubber Bulk
- 1969 High Yield Catalyst for PE
- 1972 HDPE Slurry Process
- 1975 High Yield Catalyst for PP
- 1978 Advanced PP Slurry Process
- 1982 Spheripol PP Process
- 1984 Porous Catalyst
- 1990 Catalloy Process
- 1994 Spherilene Swing LL/HDPE Process
- 2002 Spherizone Process
- 2003 Polybutene Solution Process

Foreground – First commercial reactor (1957)
Background – Modern Spheripol plant
Ferrara Site .... about our 1000 people

- R&D: 52%
- CATALYST: 21%
- M&S: 20%
- OTHERS: 7%

- 20%
- 21%
- 7%
Ferrara Site .... about our people

**AGE**
- 20 - 30: 9%
- 30 - 40: 40%
- 40 - 50: 10%
- 50 - 60: 41%

**Female is increasing**
- Male: 28%
- Female: 72%

**SCHOOLING**
- Graduate: 1%
- High school: 22%
- Other: 77%
LyondellBasell in Ferrara

From ideas to commercialisation

- Process Development Lab
- Polymer Testing & Characterisation Labs
- Product & Application Labs
- Catalyst development Labs
- Extrusion Pilot Lines
- 3 Catalyst & Support Plants
- Catalloy 105 kta
- Spheripol PP 180 kta
- 7 Pilot Plant Lines
LyondellBasell Sites in Italy

Milano

Terni: Polypropylene 245 KT/Y (Spheripol)
People: ~ 130
LyondellBasell Sites in Italy

Brindisi: Polypropylene 400 KT/y
(Spherizone + GPR; Spheripol)
People: ~160
LyondellBasell vs. external audience
National and Community Involvement

• Member of:
  – Federchimica (National Chemical Company Federation)
  – PlasticsEurope Italy (President G. Rossi & A. De Vries VP PE Europe)
  – Confindustria (National Industry Association):
    Brindisi, Ferrara, Milano, Terni

• Community relationships
  – Regular meetings with local authorities (Permits releases, local regulations, Accordo di Programma, EMAS certification, etc.)
  – Open day for the public (> 2000 visitors in 2004)
  – Masters with Ferrara and Rome Universities on Science, Environment, Technology & Management involving 15-20 international students per year
Organisational values for Ferrara

- Organization flexibility: CAT, 18 months contract
  - a tool covering peak workloads
  - 800 participants in 10 years
  - an excellent selection method
  - 12% eventually recruited in Basell indefinitely

- Law’s requirements: “Legge 68”, employment of disabled personnel
  - presently 15 individuals are employed
  - agreement with social co-ops as contractors

- Social initiative: “Progetto Pegaso”, a community project for reinsertion of inmates into the social life
  - Jointly developed with City Jail and ENAIP with the support of City Council, Province and Unions
  - 10 inmates (or former) for 12 months
Confindustria Awards for Excellence

Basell Italy has come second in the ‘Innovation’ section of a prestigious awards scheme introduced in 2006 by the main national industrial and business association of Italy, Confindustria. Basell is one of 120,000 member-companies.

The silver award recognises the work of Basell’s R&D employees in Ferrara in developing polyolefin and polypropylene products and catalysts, and patenting and licensing them worldwide. The team is supported by R&D colleagues in Frankfurt and Elkton.

The award scheme aims to identify the best company in three sectors: ‘Local increase in value’, ‘Made in Italy’ and ‘Innovation’. More than 200 companies entered the Innovation category. Basell Italy had to submit papers and commendations to support global evaluation of the company over the previous three years, the evaluation criteria including return on investment, R&D spend, new products and patents, technical leadership, scientific and external collaborations.

A panel drawn from 400 member-companies, the scientific/academic community and technical members of Confindustria selected three finalists in each category. The finals were then held in Turin on 12 December, and the awards presented by Italian Government Minister, E. Bonino, and Confindustria’s President, L. Di Montezemolo. The silver ‘Company Excellence for Innovative’ award was received by Basell Italy’s President, Giuseppe Rossi, and Luca Scanavini, External Affairs manager.
Roma event, May 2006

mo...moplen
Il design delle plastiche negli anni del boom
Plastic design in Italy’s boom years

Mostra
25 maggio - 8 giugno
14:30 - 19:30
Inaugurazione: 25 maggio ore 19:00

www.romadesignpiu.it
Italian plastic promotion campaign

• Articles on magazines: Airone (popular)
  Chimica e Industria (technical)

• Events managed by PlasticsEurope Italy:
  Hey! Sono un polimero!

May – October 2006
The web site www.sonounpolimero.it (June - October)

- > 64.128 visitatori diversi
- > 1.846.904 contatti
- > 39,72 giga scaricati
- > 1.559.910 pagine visitate
- > 9.837 giocate al Poligame
- 3.297 registrati
- 4.342 risposte al sondaggio
- visite da oltre 60 Paesi in tutto il mondo (Italia > 98%)
Events: Polymer’s night

**Milano**

*Happy Hours*
- Matricola Irish Pub 21/06/06
- Bar Bianco (12 luglio)

*Disco*
- Cheval (14 luglio)

*Notte bianca*
- Exploit – La notte bianca dei polimeri (24 giugno)

**Roma**

*Disco*
- Open Bar Disco - Ostia (24 giugno)
- Open Bar o Area Olimpico (5/7 luglio)
Ferrara, 29.09.06

Dall’Happy Hour a tarda notte:

- oltre 600 ragazzi coinvolti
- 500 T-shirt, 450 borse, 100 bicchieri e 400 collanine
- + 74% visite al sito dall’esposizione della locandina e degli inviti (27.09.06) ad oggi, rispetto alla settimana precedente
- + 375% iscritti nello stesso periodo
Ferrara, 29.09.06
Ferrara, May 2007
Seminar “PP uno sguardo al Passato per andare verso il Futuro”
“G. Natta Award” (Premio Natta)

To celebrate the birth centenary of Nobel prof. G. Natta (2003), this prize is awarded to a senior researcher, whose scientific activity contributed substantially in improving the quality of our life.
It’s autumn 2007, the promotion campaign managed by Plastics Europe Italia has been implemented in Milano, using trams covered by advertising posters. The trams travel up and down a big part of the downtown.
Milano, 13 November 2007

2030
La società prossima ventura
Il ruolo della plastica

Milano, 13 novembre 2007
Politecnico di Milano - Edificio N + Via Durando, 10 + Milano Bovisa

Ore 10.00 Apertura dei lavori
Coordina Antonio Cianciullo, La Repubblica
Giulio Ballo, Rettore Politecnico di Milano
Giorgio Squiri, Presidente Federchimica
Giuseppe Rossi, Presidente PlasticaEurope Italia
Ray Hammond, Futurologo
Sezione interattiva dialogo con gli oratori

Ore 12.00 Collaborazione Politecnico e Industria nella didattica:
Il corso di laurea LIM-pol
Laurea in Ingegneria Materiali polimerici
Andrea Pavan, Vice Direttore Dip. Chimica, Materiali e Ingegneria Chimica, Politecnico di Milano

Ore 12.15 Conferimento delle Borse di Studio
Cocktail

Segreteria organizzativa: puranch@federchimica.it - Tel. 02 34565.309 - n.autana@federchimica.it - Tel. 02 34565.359
Genova, 25 October - 6 November 2007: Festival of the Science

From Italian newspapers:

• *Nell’ambito del Festival della Scienza di Genova si svolge la mostra “La danza degli elementi”. Il prof. G. Cevasco del Dipartimento di Chimica di UNIGE organizza una parte della sala al “Moplen”. Basell abbiamo prestato la miniatura della molecola del polipropilene isotattico esposta a Ferrara e circa 500 brochure.*

• *Nell’ambito del Festival, il 29 ottobre si è svolta la cerimonia conclusiva del Premio Nazionale Federchimica Giovani 2007 sezione plastica, a cui Basell Poliolefine Italia srl aderisce, rivolto alle scuole primarie e secondarie di primo grado.*
Global Care Day Italy: April 2008

Brindisi

Ferrara

Milano

Terni
Ferrara, May 2008: Plastics Europe General Assembly
Milano, September 2008: Materioteca®
Ferrara, September 2008: Remtech Expo
Rome, October 2008: Forum ESPERA

FORUM 2008
Etica & Scienza per l’Ambiente

Valmontone (Roma)
2 Ottobre 2008
CERI Palazzo Doria Pamphilj

Segretario Organizzatore:
L. Scanavini, Ferrara
Center of Excellence for Research and Development in the Chemical and Petrochemical Industry (CRIFAP)

Ambiente
Thank you very much!