RDPower S.r.l.

Developing Innovation

COMPANY PROFILE

HYSTORY

RDPower s.r.l. is a small enterprise recently founded by a group of young researchers with a brilliant university background, consolidated by almost ten years work in industrial and academic European and Italian institutions.
Based on their common intent aiming at exploiting at the best the rather short but intensive experience, and joined by an enthusiastic spirit wishing at growing competencies and finalizing the work towards chemistry applications and energy and environmental R&D activities, they founded RDPower.
The company was born in 2011, with the help of a financial support assigned by Regione Umbria, Italy to new enterprises bringing innovative ideas. The company is located nearby the "enterprise incubator" in Terni, Italy on the basis of a permit received from Sviluppumbria s.p.a, the Umbria regional institution in charge for the economical development of the area.

PRODUCTS & SERVICES

Industrial R & D
RDPower offers R & D services to any industrial company, particularly to SME whishing to innovate their technological and management status. The company operates in the following R&D sectors:
Processes and Products Development and Technology Transfer in subjects such as:

- Renewable Energy,
- Green Chemistry,
- Supramolecular Chemistry,
- Clean Technologies,
- Material Recovery and Regeneration,
- Energy from Waste,
- Waste and Wastewater Treatment,
- Advanced Measurements Systems,
- Nanostructures, Nanomaterials and Nanotechnologies.

Scientific and Technological Consulting
RDPower owns all the expertise needed to assure any consultancies in the following main areas:

- Renewable Energy,
- Processes for Materials Regeneration and Recycling,
- New Materials,
- Nanotechnologies,
- High Pressure Processes,
- Chemistry and Green Chemistry,
- Intellectual Properties,
- Patent Analysis,
- Technological Monitoring,
- Economic and Market Analysis,
- Energy and Environmental Analysis, particularly Life Cycle Analysis.

COMPETENCIES

The background of the main components of the research team matured through an intensive working experience in research centres of big industrial companies and European universities, rely on the following main topics:

Supercritical Fluids:
The expertise includes many subjects as listed in the following:

- Waste treatment in Supercritical Water,
- Supercritical Water Oxidation (SCWO) and Supercritical Water Gasification (SCWG),
- Supercritical Water Oxidation in Hydrothermal Flame (SCWO-HF),
- Extraction in Subcritical and Supercritical Fluids as CO_2, Water, Organic Solvents,
- Nanomaterial production in Supercritical Fluids through advanced processes such as RESS (Rapid Expansion of Supercritical Solutions), PGSS (Particles from Gas Saturated Solutions), GAS (Gas Antisolvent crystallisation), SAS (Supercritical Anti Solvent).

In these areas studies related to technological monitoring, technical, economical and environmental analysis as well basic research including design, construction and operation of laboratory and small bench plant units in order to ascertain technical feasibility and get the basic know how can be carried out.

Oil & Gas
Main expertise in this sector embraces topics concerning:

- Characterization of the effect of Surface Active Agents on the formation and inhibition of Gas Hydrates,

- Measurements of CMC e Kraft Point of Ionics Surface Active Agents under high pressure, low temperature and in the presence different gaseous atmosphere for Gas Hydrates formation (patent WO2007122647),
- Colorimetric Characterization Gas Hydrates,
- Development of Model for prediction of gas hydrates formation in pipe lines and wells,
- Characterization and QSAR Modelling on the effect of Inhibitors and Promoters on gas hydrates Formation,
- Advanced Formation Processes Binary Gas Hydrates and gaseous Hydrogen Hydrates (patent EP07010346),
- Advanced technologies on application of Gas Hydrates Gas Mixture Purification (patent WO2010018609),
- Characterization and Modelling on the effect surface active agents in Enhanced Gas Recovery, and in Flow Assurance particularly on the effect of surface active agents for foam formation and measurements of surface active rheological properties under temperature, pressure, salinity, water/gas/hydrocarbon ratio actual well condition,
- Systems capable to simulate well and pipelines in order to measure chemical properties of Gaseous Mixtures under actual temperature and pressure conditions.

Waste Treatment and Management and Product Recovery

The knowledge in this area can be divided in the three following main branches:

- Applications of processes based on Green Chemistry and Clean Technologies approaches for waste and wastewater treatment, reuse, recycling and energy recovery,
- Purification, Decontamination, Regeneration and product recovery from waste and wastewater by Supercritical Fluids Extraction,
- Analysis of the existing waste and wastewater facilities and related management procedures and identification of new procedure capable to improve the current performance both in terms of specification of treated streams and utilities consumptions.

Renewable energy

Available capabilities allows to address R&D subjects concerning Energy and Bio fuel from Biomass, Mini Solar Thermodynamic, Miniheolic, as well as studies related to Economical, Environmental and Social Sustainability on the subjects above, particularly by using LCA models.

Advanced Process Control Systems

Expertise is also available for design construction and assistance to operation of cable and wireless SCADA, DCS, RTU systems, custom based sensor on open source hardware and software packages.

ACTIVITIES

BRAI-COST S.p.A.:
Basic Research and Development at industrial scale of a process for waste polymers rigeneration and their use for production of modified bitumen matrices

Pulsioni Group S.r.l.:
Basic Research and Development at pilot scale of SCWO e SCWG processes for waste treatment.

Studio Associato 2P:
Technical consultancy on a process for treatment and regeneration of surface active containing wastewater

Applitech S.r.l.:
Basic Research and Development of wireless capacitive systems capable to detect organic solvent loss from industrial facilities and piping

PROJECTS

Gas Hydrates:
Development of processes based on gas hydrates formation for separation and purification of gaseous mixtures. Design and construction of continuous apparatus

Probes
Development of special not conductometric probes capable to detect the concentration non ionics substances in water and their application to the measurement of the Critical Micellar Concentration on non ionic surface active agents and the Critical Aggregation Concentratio (CAC) of amphiphilic non ionic polymers. The porbes have been designed and constructed in order to be installed and operate in high pressure and temperature systems.

Thermoacoustics:
Study of innovative systems for efficient conversion of thermal energy in electricity with external combustion engines such as Stirling, Stirling, Stirling free piston and Stirling Thermoacoustics at stationary and progressive wawe. Construction of small scale prototypes, materials selection and study of geometry, dynamics and conversion efficiency.

TEAM

Simone Arca
Managing Partner

Ph D in Chemistry, 8 years Research on: Gas Hydrates, Supercritical Fluids, Nanotechnologies, Characterization of Cationic Anionic and non Ionic Surface Active agents, Water/Oil emulsion and Oil/Water Nanoemulsion.
2008, Research grant: *STUDY OF PRPERTIES OF NEW SYTNETIZED ANPHIPHILIC MOLECULES AND THEIR NANOSTRUCTURES IN AQUEOUS MEDIA.*
2009, Financial grant from Region Umbria for the study on gas hydrates formation on Biogas streams.
2010 Financial grant from Regione Umbria on an abroad stage on wastewater treatment based on Supercritical Water Oxidation, Products recovery by Supercritical Fluids Extraction, Nanotechnologies based su Supercritical Fluids.
2011 Financial grant from Regione Umbria, on a study Biogas purification and methane production by Gas Hydrates formation

Patents:
WO2007122647: *APPARATUS FOR PREPARING AND STUDYING CLATHRATE HYDRATE.* High pressure equipment for studying the effect of surface active agents on gas hydrates formation. The equipment allows the characterization of surface active agents under high pressure, low temperature real conditions of gas hydrates formation.
EP07010346: *METHOD FOR THE PRODUCTION OF BINARY CLATHRATE HYDRATES OF HYDROGEN*. Process capable to exploit properties of Water/Oil emulsions and Nanoemulsions in order to increase the kinetic formation of Binary Gas Hydrates formation which need the presence of a Co-Former. Good results obtained on the formation of hydrogen Gas Hydrates.
EP2287118: *PROCESS AND INSTALLATION FOR MAP PRECIPITATION AND HYDROGEN PRODUCTION*. Process and plant for treatment of ammonium containg wastewater by its conversion in hydrogen and related energy recovery

Publications:
3 publications on international journals, 21 lectures/posters in national and international conferences

Emilio D'Alessandro
Managing Partner

Chemistry Degree, 8 years industrial research on: Cement and hydraulic binders, Raw Materials and fuels for cement industry, industrial automation nearby Cementir Holding S.p.A.

Patents:
ITCH20070004 CHROMATIC INDICATOR FOR THE PRESENCE OF ORGANIC SOLVENTS
Publications: one publication in an international journal, 2 lectures/posters in national and international conferences

Filippo Maccioni
Coworker

Chemistry Degree, Ph D in Industrial Chemical Processes, 10 years university research on: Gas Hydrates, Oil&Gas procsses, Bitumen, Quaternary Ammonium Salts and Surface Active agents for flow-assurance.
Contract work in the Oil and Gas “upstream” e “downstream” both in Italy and abroad. Cooperation with a number of companies suh as: Enitecnologie, AgipKCO, Renco spa, Eni E&P, Eni Corporate University, Api-Raffineria di Ancona, Polimeri Europa (Sarroch), Raffineria di Roma (TotalFinaElf) e Dolphin Energy (QATAR), PB Oil, Finambiente, Gas&Oil Trader srl.

Patents:
WO2010018609: *SEPARATION OF ACIDIC GASEOUS MOLECULES FROM NATURAL GAS BY HYDRATES CONTROLLED DISSOCIATION*

Publications:
15 publications on International and national journals, 6 lectures/posters in national and international conferences.