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### **Personal information**

Birth date: 27 November 1975,  
Place of birth: Castelnuovo di Garfagnana (LU), Italy  
Nationality: Italian  
Marital status: married (1 daughter)

### **Education**

#### **Ph.D in Macromolecular Chemistry, Scuola Normale Superiore of Pisa (20 May 2005)**

Thesis title: "New Processing Routes for the Introduction of Functionalities in Hydrocarbon Polymers: the Exploitation of Chemical Modification in Homogeneous and Heterogeneous Systems" (70/70 cum Laude).

Research Advisors: Prof. Francesco Ciardelli (University of Pisa) and Dr. Franco Peruzzotti (Pirelli Labs, Milano). External Examiners: Prof. Krzysztof Matyjaszewski (Carnegie Mellon University, Pittsburgh, PA) and Prof. Nicola Tirelli (The University of Manchester, Manchester, UK).

#### **Master Degree in Chemistry, Department of Chemistry and Industrial Chemistry, University of Pisa (15 February 2001)**

Thesis title: "Radical functionalization of polypropylene in the melt" (110/110 cum Laude).  
Academic advisors: Prof. Mauro Aglietto and Prof. Carlo Carlini (University of Pisa)

#### **High School Graduation in Scientific Studies, Liceo Scientifico "Ulisse Dini" of Pisa (July 1994)**

National Foreign Language (English) experimental Project,

### **Positions, work experience and training**

#### **Researcher at CNR-ICCOM UOS Pisa (November 2011 onwards)**

Polymeric Materials Chemistry Laboratory.

CNR Project: PM.P03.015.005 "Sviluppo e applicazioni di metodologie preparative di materiali polimerici funzionali nanostrutturati in processi di reactive blending" (Responsible Dr. E. Passaglia).

**Post-doc fellow at CNR-ICCOM UOS Pisa (Jun 2011 - Nov 2011)** in the frame of the research agreement with BASF Construction Chemicals Italia S.p.a. Research topic: "Study of the radical grafting of monomers bearing carboxylic moieties onto propylene polymers" Research Advisor: Dr. E. Passaglia.

**Post-doc fellow at CNR-ICCOM UOS Pisa (Jun 2010 - May 2011)** in the frame of the research agreement with FARAPLAN S.p.A. Research topic: "Synthesis and characterization of polymer based nanostructured systems through dispersion of lamellar nanofillers". Research Advisor: Dr. E. Passaglia.

**Associate Researcher at Centro Italiano Packaging of Venezia-Marghera (Jun 2006 – May 2009)** in the frame of the Italian MIUR-FIRB project NANOPACK Prot. N. RBNE03R78E on the "Synthesis

and characterization of new nanostructured materials and polymer films for flexible packaging applications”.

**Post-Doc fellow at CNR-ICCOM Pisa Section (July 2005 – May 2006)** in the frame of the NANOHYBRID SRTP project under 6th FP. NMP3-CT-2005-516972 “Designed Nanostructured Hybrid Polymers: Polymerisation Catalysis and Tecton Assembly. Research Advisor: Dr. E. Passaglia.

**Project coworker at CNR-ICCOM Pisa Section (Jan 2005 - June 2005)** in the frame of the research agreement with Crosspolimeri. Research topic “Study about synthesis and characterization of polymer materials for special use”. Research Advisor: Dr. E. Passaglia.

**Research coworker at the Department of Chemistry and Industrial Chemistry, University of Pisa, CNR-ICCOM Pisa Section (Jan 2005- Dec 2010)** in the frame of the research agreements with Total-Arkema, DOW, SpecialChem. Research Advisors: Dr. E. Passaglia, Prof. Francesco Ciardelli

**Visiting PhD student at the School of Pharmacy & Centre for Molecular Materials, The University of Manchester (UK) (July 2004 – Oct 2004).** Main research activities: Synthesis of a polycationic macroinitiator by Atom Transfer Radical Polymerization (ATRP): macroinitiator adsorption on silica nanoparticles and surface initiated polymerization

**Ph.D. student at Scuola Normale Superiore of Pisa, Department of Chemistry and Industrial Chemistry, University of Pisa (Jan 2002 – Dec 2004).** Experimental thesis work on polyolefin free radical functionalization: structural, thermal, mechanical and rheological characterization. Design, synthesis and testing of new functional reagents. Functionalization of inorganic-organic hybrid particles from used tires: surface grafting of organic moieties; synthesis of layered core-shell structures by in-situ classical and controlled radical polymerization. The fellowship was funded by Fondazione Silvio Tronchetti Provera. Part of the research findings have been patented by PIRELLI Labs (S. Coiai, et al. PIRELLI & C. S.p.A, US 2008/0132642 A1; S. Coiai, et al. PIRELLI & C. S.p.A, EP 1778753 B1).

**Graduate fellowship at National Institute for the Physics of Matter (INFN), Pisa Section, c/o Department of Chemistry and Industrial Chemistry, University of Pisa (March – Dec 2001)** Main research activities: Selective crosslinking process of a semi-crystalline polyolefin (or a mixture of different polyolefins) for packaging application. Spectroscopic characterization of polymer materials.

## Research interests

- Preparation and characterization of functional polymers by free radical post-reactor reactions: modulation of the functionalization degree and control of macromolecular secondary reactions.
- Preparation and characterization of polymer nanocomposites: from oil and bio-based polymers: study of polymer-filler interactions vs morphology and final properties.
- Multifunctional “green” bio-plastic based nanocomposites via immobilization of functionalized nanoparticles and stabilizing molecules.
- Modification of inorganic and hybrid micro- and nanoparticles via classical and controlled/living free radical polymerization techniques.

## Partecipation and coordination of research projects

- **Scientific responsible of the CNR research unit in the project FIRB Futuro in Ricerca 2010: GREENER** - Towards multifunctional, efficient, safe and stable “green” bio-plastics based nanocomposites of technological interest via the immobilization of functionalized nanoparticles and stabilizing molecules” Prot. RBFR10DCS7
- **Participant of the FP7 project NMP.2011.LARGE.5 280676: DIBBIOPACK** - Development of injection and blow extrusion molded biodegradable and multifunctional packages by

nanotechnology: improvement of structural and barrier properties, smart features and sustainability.

- **Participant of the national project PRIN2008:** Biopolyester based nanohybrid materials through reactive blending of opportunely modified polymers and inorganic substrates (prot. 200898KCKY\_004)
- **Researcher contract in the national project FIRB 2003 NANOPACK** - Nuovi materiali e film polimerici nanostrutturati a ridotto impatto ambientale, con proprietà di risposta verso agenti chimici e fisici, per il packaging flessibile. Studio di: fenomenologia microscopica, modelli e simulazioni, verifiche sperimentali e processi di polimerizzazione e miscelazione (prot. RBNE03R78E):
- **Post doc fellow in the FP6 project Specific Targeted Research Project NMP3-CT-2005-516972: NANOHYBRID** - Designed Nanostructured Hybrid Polymers: Polymerisation Catalysis and Tecton Assembly.

## Reviewer

Polymer International, Journal of Polymer Engineering, Journal of Applied Polymer Science, Langmuir, Industrial & Engineering Chemistry Research, European Polymer Journal, Carbohydrate Polymers, Express Polymer Letters, Iranian Polymer Journal, e-polymer, Journal of Physics and Chemistry of Solids, Applied Surface Science.

## Teaching Experience

- Contract Professor at Scuola Superiore Sant'Anna of Pisa in Level II Masters "Environment Management and control: techniques and technologies for the waste Cycle" (2008-2011)
- Invited Professor at XXIX Convegno-Scuola AIM "Cicli di vita dei materiali polimerici" (2008)

## Publications

Author of 31 Peer-reviewed scientific articles. 1 journal cover. 5 Book chapters. 4 Patents, and more than 70 communications to congresses

### 2013

- F. Liguori, S. Coiai, E. Passaglia, P. Barbaro "Strong cation exchange with innocence: synthesis and characterization of borate containing resins and macroporous monoliths" *Macromolecules*, in press
- Nuzzo, S. Coiai, S. C. Carroccio, N. Tz. Dintcheva, C. Gambarotti, G. Filippone "Heat-Resistant Fully Bio-Based Nanocomposite Blends Based on Poly(lactic acid)" *Macromol. Mater. Eng.* DOI:10.1002/mame.201300051
- L. Pérez Amaro, S. Coiai, L. Conzatti, A. Manariti, F. Ciardelli, E. Passaglia "The effect of LDH dispersion on thermal and mechanical properties of PVC/PMMA blends" *Polym. Int.* 2013, 62, 554–565.
- S. C. Carroccio, G. Curcuruto, N. Tz. Dintcheva, C. Gambarotti, S. Coiai, G. Filippone "Using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry for the characterization of functionalized carbon nanotubes" *Rapid Communications in Mass Spectrometry* 2013, 27, 1359–1366.
- S. Coiai, D. Prevosto, M. Bertoldo, L. Conzatti, V. Causin, C. Pinzino, E. Passaglia "Chemistry of Interfacial Interactions in a LDPE-Based Nanocomposite and Their Effect on the Nanoscale Hybrid Assembling" *Macromolecules* 2013, 46, 1563–1572.

## 2012

- F. Cicogna, S. Coiai, C. Pinzino, F. Ciardelli, E. Passaglia "Fluorescent polyolefins by free radical post-reactor modification with functional nitroxides" *React. Funct. Polym.* 2012, 72, 695-702.
- S. Coiai, F. Cicogna, E. Passaglia "Reazioni su polimeri" in Sintesi di materiali polimerici, XXXIII Convegno-Scuola AIM "Mario Farina", p.355, Collana AIM quaderni, Edizioni Nuova Cultura, Roma (Italy), 2012, ISBN: 9788861348103.

## 2011

- F. Cicogna, S. Coiai, E. Passaglia, I. Tucci, L. Ricci, F. Ciardelli, A. Batistini "Grafting of Functional Nitroxyl Free Radicals to Polyolefins as a Tool to Postreactor Modification of Polyethylene-Based Materials with Control of Macromolecular Architecture" *J. Polym. Sci. Pol. Chem.* 2011, 49, 781-795.
- N. Muksing, R. Magaraphan, S. Coiai, E. Passaglia "Effect of surfactant alkyl chain length on the dispersion, and thermal and dynamic mechanical properties of LDPE/organo-LDH composites" *Express Polym. Lett.* 2011, 5, 428-448.
- S. Coiai, M. Scatto, L. Conzatti, F. Azzurri, L. Andreotti, E. Salmini, P. Stagnaro, A. Zanolin, F. Cicogna, E. Passaglia "Optimization of organo-layered double hydroxide dispersion in LDPE-based nanocomposites" *Polym. Advan. Technol.* 2011, 22, 2285-2294.
- F. Azzurri, P. Stagnaro, L. Conzatti, D. Cavallo, L. Repetto, M. Scatto, L. Andreotti, S. Coiai "Flow induced crystallization of LDPE nanocomposites: A rheological and morphological characterization" *e-Polymers* 2011, No. 023, ([http://www.e-polymers.org/journal/papers/fazzurri\\_150311.pdf](http://www.e-polymers.org/journal/papers/fazzurri_150311.pdf)).
- M. Penco, G. Spagnoli, Md. A. Rahman, E. Passaglia, S. Coiai, F. Ciardelli "Nonisothermal Crystallization Kinetics of Polypropylene-Layered Double Hydroxide Composites: Correlation With Morphology" *Polym. Composite.* 2011, 32, 986-993.
- E. Passaglia, S. Coiai "Functional Polyolefins for polyolefin/clay nanocomposites" in V. Mittal (Ed.) *Advances in Polyolefin Nanocomposites*, Chapter 11 pp 285-328, CRC Press Taylor and Francis Group, Boca Raton, FL (USA), 2011, ISBN: 9781439814543.

## 2010

- S. Coiai, S. Augier, C. Pinzino, E. Passaglia "Control of degradation of Polypropylene during the radical functionalization with furan and thiophene derivatives" *Polym. Degrad. Stab.* 2010, 95, 298-305.
- S. Coiai, E. Passaglia, A. Hermann, S. Augier, D. Pratelli, R. C. Streller "The influence of the compatibilizer on the morphology and thermal properties of polypropylene layered double hydroxide composites" *Polym. Composite.* 2010, 31, 744-754.
- N. Muksing, S. Coiai, L. Conzatti, E. Passaglia, R. Magaraphan, F. Ciardelli "Morphology development and stability of Polypropylene/organoclay nanocomposites" *J. Nanosci. Nanotechnol.* 2010, 10, 5814-5825.
- S. Augier, S. Coiai, E. Passaglia, F. Ciardelli, F. Zulli, L. Andreozzi, M. Giordano "Structure and rheology of polypropylene with various architectures prepared by coagent-assisted radical processing" *Polym. Int.* 2010, 59, 1499-1505.
- M-B. Coltelli, S. Coiai, S. Bronco, E. Passaglia "Nanocomposites based on phyllosilicates: from petrochemicals to renewable thermoplastic matrices" in K. E. Geckeler, H. Nishide (Eds.), Chapter 13 pp 403-458, *Advanced Nanomaterials*, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim (Germany), 2010, ISBN: 9783527317943.

## 2009

- L. Pérez Amaro, B. L. Rivas, S. Coiai, E. Passaglia, F. Ciardelli "Functionalization of polypropylene and its potential uses as metal - ion adsorption resin" *J. Appl. Polym. Sci.* 2009, *113*, 290-298.
- S. Augier, S. Coiai, D. Pratelli, L. Conzatti, E. Passaglia "New Functionalized Polypropylenes as Controlled Architecture Compatibilizers for Polypropylene Layered Silicates Nanocomposites" *J. Nanosci. Nanotechnol.* 2009, *9*, 4858-4869.
- S. Coiai, M. Scatto, M. Bertoldo, L. Conzatti, L. Andreotti, M. Sterner, E. Passaglia, G. Costa, F. Ciardelli "Study of the compounding process parameters for morphology control of LDPE/layered silicate nanocomposites" *e-polymers* 2009, No. 050 ([http://www.e-polymers.org/journal/papers/scoiai\\_280509.pdf](http://www.e-polymers.org/journal/papers/scoiai_280509.pdf)).
- E. Passaglia, S. Coiai, S. Augier "Control of macromolecular architecture during the reactive functionalization in the melt of olefin polymers" *Prog. Polym. Sci.* 2009, *34*, 911-947 (Review).
- L. Lotti, S. Coiai, F. Ciardelli, M. Galimberti, E. Passaglia "Thiol-ene Functionalisation of Low Molecular Weight Polybutadiene with L-Cysteine Derivatives" *Macromol. Chem. Phys.* 2009, *210*, 1471-1483.

## 2008

- S. Coiai, E. Passaglia, S. Augier, P. Narducci, F. Ciardelli "Organophilic boehmite nanoparticles by ATRP methacrylates polymerization: synthesis, characterization and dispersion in Polypropylene" *J. Nanosci. Nanotechnol.* 2008, *8*, 1803-1811.
- F. Ciardelli, S. Coiai, E. Passaglia, A. Pucci, G. Ruggeri "Nanocomposites based on polyolefins and functional thermoplastic materials" *Polym. Int.* 2008, *57*, 805-836 (Review).
- M. Penco, S. Della Sciucca, E. Passaglia, G. Giordani, S. Coiai, L. Di Ladro "Effect of reactive melt mixing on the morphology and thermal behavior of linear low-density polyethylene/rubber blends" *J. Appl. Polym. Sci.* 2008, *109*, 1014-1021.
- E. Passaglia, M. Bertoldo, S. Coiai, S. Augier, S. Savi, F. Ciardelli "Nanostructured polyolefins/clay composites: role of the molecular interaction at the interface" *Polym. Advan. Technol.* 2008, *19*, 560-568.
- E. Passaglia, S. Coiai "Polverino di pneumatico da riciclo in miscelazione reattiva" in *Cicli di vita dei materiali polimerici*, XXIX Convegno-Scuola AIM "Mario Farina", p. 165, Libro raccolta delle lezioni, Pacini Editore, Pisa (Italy), 2008, ISBN: 9788877819871.

## 2006

- S. Coiai, E. Passaglia, F. Ciardelli, D. Tirelli, F. Peruzzotti, E. Resmini "Modification of Cross-Linked Rubber Particles by Free Radical Polymerization" *Macromol. Symp.* 2006, *234*, 193-202.
- S. Augier, S. Coiai, T. Gagnoli, E. Passaglia, J-L Pradel, J-J Flat "Coagent Assisted Polypropylene Radical Functionalization: Monomer Grafting Modulation and Molecular Weight Conservation" *Polymer* 2006, *47*, 5243-5252.
- S. Coiai, E. Passaglia, F. Ciardelli "Gradient Density Grafted Polymers on Ground Tire Rubber Particles by Atom Transfer Radical Polymerization" *Macromol. Chem. Phys.* 2006, *207*, 2289-2298 (COVER PICTURE).

## 2004

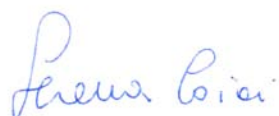
- E. Passaglia, S. Coiai, L. Ricci, F. Ciardelli "Study of Grafting Reactions of Polar Groups onto

- Polystyrene (PS) by Reactive Mixing" *Macromol. Symp.* 2004, 218, 61-70.
- E. Passaglia, S. Coiai, G. Giordani, F. Ciardelli, L. Fambri, V. Pagani, M. Penco "Modulated Crosslinking of Polyolefins through Radical Processes in the Melt" *Macromol. Mater. Eng.* 2004, 289, 809-817.
  - S. Coiai, E. Passaglia, M. Aglietto, F. Ciardelli "Control of Degradation Reactions During Radical Functionalization of Polypropylene in the Melt" *Macromolecules* 2004, 37, 8414-8423.
  - F. Ciardelli, M. Aglietto, M. B. Coltelli, E. Passaglia, G. Ruggeri, S. Coiai "Functionalization of Polyolefins in the Melt" in F. Ciardelli, S. Penczek (Eds.) *Modification and Blending of Synthetic and Natural Macromolecules*, Chapter 4 pp 47-71, Nato Science Series, Mathematics, Physics and Chemistry-Vol 175, Kluwer Academic Publishers, Dordrecht (The Netherlands), 2004, ISBN: 1402027346.
  - F. Ciardelli, E. Passaglia, S. Coiai "A process of controlled radical grafting of a polyolefin" Università di Pisa, PCT/IB2004/002098; WO 2004/113399 A2, European Patent Specification EP 1641838 B1; United States Patent Application Publication US 2006/0148993 A1.
  - S. Coiai, E. Passaglia, C. Hirel, F. Ciardelli, D. Tirelli, E. Resmini, F. Peruzzotti "Thermoplastic elastomeric material and process for its manufacturing" PIRELLI & C. S.p.A., PCT/EP2004/008735; WO 2006/012912 A1; European Patent Specification EP 1778753 B1.
  - S. Coiai, F. Ciardelli, E. Passaglia, R. Sulcis, E. Resmini, D. Tirelli, F. Peruzzotti, "Process for manufacturing a thermoplastic elastomeric material" PIRELLI & C. S.p.A., PCT/EP2004/014313; WO 2006/063606 A1; United States Patent Application Publication US 2008/0132642 A1.

## 2003

- E. Passaglia, S. Coiai, M. Aglietto, G. Ruggeri, M. Rubertà, F. Ciardelli "Functionalization of Polyolefins by Reactive Processing: Influence of Starting Reagents on Content and Type of Grafted Groups" *Macromol. Symp.* 2003, 198, 147-160.
- F. Ciardelli, E. Passaglia, S. Coiai "Procedimento di funzionalizzazione radicalica controllata di una poliolefina" Università di Pisa, Brevetto per Invenzione Industriale 2003, TO2003A000478.

Firma



Pisa, July 9<sup>th</sup> 2013