

**CURRICULUM VITAE ABREVIADO (CVA)**

**Fecha del CVA** | Enero 2023

**Parte A. DATOS PERSONALES**

Nombre	ALBERTO		
Apellidos	ABAD SECADES		
Sexo (*)	HOMBRE	Fecha de nacimiento (dd/mm/yyyy)	04/10/1972
DNI, NIE, pasaporte	25461393W		
Dirección email	abad@icb.csic.es	URL Web	<a href="https://www.icb.csic.es/personal/abad-secades-alberto/">https://www.icb.csic.es/personal/abad-secades-alberto/</a>
Open Researcher and Contributor ID (ORCID*)	0000-0002-4995-3473		

**A.1. Situación profesional actual**

Puesto	Investigador Científico OPI		
Fecha inicio	01/08/2018		
Organismo/ Institución	Agencia Estatal Consejo Superior de Investigaciones Científicas		
Departamento/ Centro	Instituto de Carboquímica		
País	España	Teléfono	976733977
Palabras clave	Combustión, gasificación, captura de CO <sub>2</sub> , hidrógeno, fluidización, biomasa, reformado, sorbentes cálcicos, transportadores de oxígeno, "Chemical Looping"		

**A.2. Situación profesional anterior (incluye interrupciones en la carrera investigadora, de acuerdo con lo indicado en la convocatoria, indicar meses totales)**

Periodo	Puesto/ Institución/ País / Motivo interrupción
19/07/08 - 31/07/18	Científico Titular Instituto de Carboquímica (ICB-CSIC)
01/01/08 - 18/07/08	Contrato Programa Ramón y Cajal en ICB-CSIC
01/11/06 - 31/12/07	Contrato post-doctoral en ICB-CSIC
01/11/04 - 31/10/06	Beca postdoctoral (MEC) en Chalmers University of Technology (Goteborg, Suecia)
01/01/03 - 31/10/04	Contrato post-doctoral en ICB-CSIC
01/01/99 - 31/12/02	Beca F.P.I. (MEC) en ICB-CSIC
01/07/98 - 31/12/98	Contrato predoctoral (CE-JOULE) en ICB-CSIC
01/09/96 - 31/12/97	Tesina de Licenciatura en ICB-CSIC

**A.3. Formación Académica**

Grado/Master/Tesis	Universidad/País	Año
Licenciado Ciencias Químicas	Universidad de Zaragoza/España	1996
Doctor Ciencias Químicas	Universidad de Zaragoza/España	2003

**Parte B. RESUMEN DEL CV.**

Dr. Alberto Abad graduated in chemistry from the University of Zaragoza in 1996, and PhD (extraordinary doctorate award in Science, Chemistry) from the same university in 2003. During the pre-doc step he gained experience on coal gasification and Sulphur removal with Ca-based sorbents. As post-doc researcher, he made a postdoctoral stay at Chalmers University of Technology for two years. Since 2006, he has been working in the Department of Energy and Environment at the Instituto de Carboquímica (CSIC) in Zaragoza. He belongs to the "Combustion and Gasification" group, an excellent research group recognized by the Aragon region lead by Prof. Juan Adánez. Positions in this institute include R&C researcher in 2008, tenured scientist since 2008 and senior researcher since 2018. He has been recognized



with 3 research sections by CNEAI (last section evaluated in 2016) and 4 research sections by CSIC (last section evaluated in 2018).

He has focused his research activity mainly on advanced and clean combustion and gasification processes in fluidized bed reactors, such as oxy-fuel combustion and chemical looping processes to produce energy or hydrogen with CO<sub>2</sub> capture from both fossil and renewable fuels. In the last years, he has had an intense activity in the development of chemical looping technologies, mainly focused on the advance of oxygen carriers, the design and operation of pilot plants, as well as the process modelling and techno-economic assessment.

He has participated in 35 research projects highlighting projects of EU programs (Joule, FPV, FPVI, FPVII, H2020 and RFCS), and R&D national programs. He has been principal researcher in 7 of them: 3 national projects (ENE2016-77982-R, PID2019-106441RB-I00 and PDC2021-121190-I00), 1 MSCA-IF, 1 regional Gobierno de Aragón-La Caixa (2012 GALC 076) project and 2 CSIC projects (I-LINK1225 and I3). In addition, I have collaborated in different technological development projects with important companies in the energy sector, such as Alstom, Shell, BP and SENAI/Petrobras. Principal researcher in 1 technological contract with a Spanish company (PROMINDSA).

Author of 192 scientific publications (h-index = 66, Scopus) in the fields of energy and fuels, chemical engineering and environmental sciences, and 4 book chapters related to CO<sub>2</sub> capture and chemical looping. It is noteworthy the participation in 2 review works on chemical looping published in one of the most prestigious journals in the area of energy and fuels (Progress in Energy and Combustion Science, IF 2021: 35.339). He has been recognized as “Highly Cited Researcher” in the 2015-2018 period by Clarivate Analytics, being among authors within the most cited 1% in Engineering, as well as he shows a prominent position in the Spanish list provided by “Grupo para la Difusión del Índice h (DIH)” in “Chemical, Engineering” and “Energy and Fuels” (<http://indice-h.webcindario.com/>). Co-author of 6 patents related with the development of oxygen carriers for chemical looping technologies. He has presented his research in more than 80 international conferences including one keynote; participant as well as chairman in 5 of them. In addition, he has directed 4 doctoral theses and supervisor of 2 on-going theses.

Regarding research management, he has participated in projects selection commissions in national calls: ENE2014 and PDC2021. Member of the organization committee of the “Clean Coal Technologies 2011” conference and the “Internacional Conference on Chemical Looping” 2022.

Regarding university teaching, he has been teacher in the Master “Iniciación a la Investigación en Ingeniería Química y del Medio Ambiente” of Universidad de Zaragoza, from 2009-2013, and the summer course in Zaragoza University “El reto de la energía hacia los objetivos de desarrollo sostenible” (2019 and 2021), as well as invited in the seminary program in Ottawa University with the title “Chemical Looping: An Innovative Technology for Efficient CO<sub>2</sub> Capture” (2018). He is also involved in science outreach activities, participating in the Science week at CSIC, several scientific workshop for school children, and responsible of the workshop “The Climate Fresk” in ICB-CSIC.

## Parte C. LISTADO DE APORTACIONES MÁS RELEVANTES

### C.1. Publicaciones más importantes en libros y revistas con “peer review” (highly cited & high IF; \* corresponding author)

#### a) Last two years in high IF journals or being highly cited

1. Bartocci, P.\*, Abad, A., Mattisson, T., ...(+8), Fantozzi, F. Bioenergy with Carbon Capture and Storage (BECCS) developed by coupling a Pressurised Chemical Looping combustor with a turbo expander: How to optimize plant efficiency. **Renewable and Sustainable Energy Reviews**, **2022**, 169, 112851. **Cited 0 times. IF= 16.799**

2. Cabello, A., Abad\*, A., Izquierdo, M.T., ...García-Labiano, F., Adánez, J. Qualification of operating conditions to extend oxygen carrier utilization in the scaling up of chemical looping processes. **Chemical Engineering Journal**, **2022**, 430, 132602. **Cited 7 times. IF= 16.744**

3. Cabello, A.\*, Mendiara, T., Abad, A., Izquierdo, M.T., García-Labiano, F. Production of hydrogen by chemical looping reforming of methane and biogas using a reactive and durable Cu-based oxygen carrier. **Fuel**, **2022**, 322, 124250. **Cited 11 times. IF= 8.035**



4. Condori, O., García-Labiano, F.\*, de Diego, L.F., Izquierdo, M.T., Abad, A., Adánez, J. Biomass chemical looping gasification for syngas production using ilmenite as oxygen carrier in a 1.5 kWth unit. **Chemical Engineering Journal**, 2021, 405, 126679. **Cited 47 times. IF= 16.744**

#### **b) Historical in high IF journals or being highly cited**

5. Adánez, J., Abad, A. Chemical-looping combustion: Status and research needs. **Proceedings of the Combustion Institute**, 2019, 37(4), pp. 4303–4317. **Cited 108 times (36/yr). IF= 6.535**

6. J. Adánez\*, A. Abad, T. Mendiara, P. Gayán, L.F. de Diego, F. García-Labiano. *Chemical looping combustion of solid fuels*. **Progress in Energy and Combustion Science**, 2018, 65, pp. 6-66. **Cited 361 times (90/yr). IF= 35.339**

7. *Negative CO<sub>2</sub> emissions through the use of biofuels in chemical looping technology: A review*. Mendiara, T., García-Labiano, F., Abad, A., Gayan, P. de Diego, L.F., Adánez, J. **Applied Energy**, 2018, 232, pp. 657-684. **Cited 127 times (32/yr). IP= 11.446**

8. Virginie, M., Adánez, J., Courson, C.\*, ..., Abad, A. Effect of Fe-olivine on the tar content during biomass gasification in a dual fluidized bed. **Applied Catalysis B: Environmental**, 2012, 121-122, pp. 214–222. **Cited 161 times (16/yr). IF= 24.319**

9. Adanez, J.\*, Abad, A., Garcia-Labiano, F., Gayan, P., de Diego, L.F. *Progress in chemical-looping combustion and reforming technologies*. **Progress in Energy and Combustion Science**, 2012, 38 (2), pp. 215-282. **Cited 1748 times (175/yr). IF= 35.339**

10. Abad, A., Adánez, J.\*, García-Labiano, F., de Diego, L.F., Gayán, P., Celaya, J. *Mapping of the range of operational conditions for Cu-, Fe-, and Ni-based oxygen carriers in chemical-looping combustion*. **Chemical Engineering Science** 2007, 62 (1-2), pp. 533-549. **Cited 530 times (35/yr). IF= 4.889**

#### **C.3. Proyectos o líneas de investigación en los que ha participado.**

*Escalado y evaluación del proceso CLOU para generación de energía con captura inherente de CO<sub>2</sub> (UPCLOU)*. AEI «Pruebas de Concepto» (PDC2021-121190-I00) **IP: Alberto Abad**. Duración: 1-12-2021 / 30-11-2023. Financiación: 130.000 €

*Bioenergía a partir de estiércol porcino con reducción de emisiones de gases de efecto invernadero mediante el uso de transportadores sólidos de oxígeno (SWINELOOP)*. AEI PE I+D+i RETOS DE LA SOCIEDAD (PID2019-106441RB-I00) **IP: Alberto Abad**. Duración: 1-6-2020 / 31-05-2023. Financiación: 272.248 €

Chemical Looping gAsification foR sustainAble production of biofuels (CLARA) Unión Europea. H2020. (ID SEP-210486610). IP J. Adanez. Duracion:11-2018 al 10-2021. Financiación: 387.498 €

*Desarrollo de la combustion de carbón con captura de CO<sub>2</sub> por el proceso de Chemical Looping con generación de oxígeno (C4-CLOU)*. MINECO (ENE2016-77982-R). **IP: Alberto Abad**. Duración: 30/12/2016 – 29/12/2019. Financiación: 267.410 €

*Development of natural gas combustion with CO<sub>2</sub> capture by Pressurized Chemical Looping Combustion (PCLC)*. CSIC, I-LINK1225. **IP: Alberto Abad**. Instituto de Carboquímica (ICB-CSIC), CanmetENERGY (Canada), University of British Columbia (Canada), University of Calgary (Canadá), University of Ottawa (Canada). Duración: 1/1/2018-31/12/2019. Financiación: 19898€.

*Industrial steam generation with 100% carbon capture and insignificant efficiency penalty - Scale-Up of oxygen Carrier for Chemical-looping combustion using Environmentally SuStainable materials. (SUCCESS)*. Unión Europea. 7th Framework Programme. Ref. FP7-608571. IP: Juan Adánez. Duración: 01/09/2013 – 31/03/2017. Financiación: 482.628 €.

*Advanced Coal Chemical-Looping combustion. Aiming at highest performance. (ACCLAIM)*. Unión Europea. Research Fund for Coal&Steel (RFCS). Ref. RFCP-CT-2012 -00006. IP: Juan Adánez. Duración: 01/07/2012–31/12/2014. Financiación: 230.806 €.



Combustión de lignitos con captura de CO<sub>2</sub> usando transportadores sólidos de oxígeno. Gobierno de Aragón- La Caixa (2012 GALC 076). IP: **Alberto Abad**. Duración: 6/2012-9/2013. Financiación: 41320 €.

*Innovative oxygen Carriers uplifting Chemical-Looping Combustion(INNOCUOUS)*. Unión Europea. 7th Framework Programme. Ref. FP7-241401. IP: Juan Adánez. Duración: 01/09/2010 – 30/09/2013. Financiación: 371.149 €.

#### **C.4. Participación en actividades de transferencia de tecnología/conocimiento y explotación de resultados**

Contrato de investigación. *Desarrollo conceptual de una unidad de reformado autotermica por recirculacion quimica usando etanol como combustible*. Ref. : OTT20194247. SENAI (**PETROBRAS**). Brasil. IP: Juan Adánez Elorza. Duración: Julio 2019 – Diciembre 2020. Financiación: 102.600 €

Contrato de investigación. *Producción de gas de síntesis/H<sub>2</sub> con captura de CO<sub>2</sub> por reformado de líquidos combustibles ligeros (etanol, nafta) con transportadores sólidos de oxígeno*. Ref. : OTT20130989. CTGAS-ER (**PETROBRAS**). Brasil. IP: Juan Adánez Elorza. Duración: 01/03/2013 – 28/02/2016. Financiación: 449.077 €.

Contrato de investigación. *Chemical-looping combustion of sour gas, acid gas or S with Cu and Fe based oxygen carriers*. Ref. PT22648. **Shell Global Solutions** International B.V. IP: Juan Adánez Elorza. Duración: 01/07/2012-30/06/2013. Financiación: 100.158 €.

Contrato de investigación. *Chemical-looping combustion of asphaltenes*. Ref. PT26961. **Shell Global Solutions** International B.V. IP: Juan Adánez Elorza. Duración: 01/11/2012-31/10/2013. Financiación: 157.833 €.

Contrato de investigación. Optimización del proceso de retención de SO<sub>2</sub> en la planta de oxidación de lecho fluidizado circulante de el Bierzo. Ref. OTT2009487. Fundación **CIUDEN**. IP: Francisco García Labiano. Duración: 01/02/2009 – 31/01/2012. Financiación: 215.197 €.

Patente. NiO/Al<sub>2</sub>O<sub>3</sub> oxygen carrier, method for obtaining same and use thereof. Autores: J. Adánez, L.F. de Diego, F. García-Labiano, P. Gayán, A. Abad. WO2009/022046. Fecha de prioridad: 27 Julio 2007.

Patente.Solid NiO/Al<sub>2</sub>O<sub>3</sub> oxygen carrier that is useful for methane reforming, method for producing same and applications thereof. Autores: J. Adánez, F. García-Labiano, L.F. de Diego, P. Gayán, A. Abad. WO2009/101233. Fecha de prioridad: 15 Febrero 2008.

Patente.O<sub>2</sub>-Carrying material that can be obtained from CuO and MgAl<sub>2</sub>O<sub>4</sub> and the use of said material in the combustion solids with inherent CO<sub>2</sub> capture. Autores: J. Adánez, L.F. de Diego, F. García-Labiano, P. Gayán, A. Abad. WO2012140292A1. Fecha de prioridad: 13 Abril 2011.

Patente.Procedimiento de preparacion de transportadores de O<sub>2</sub>, producto asi obtenido y su uso. Autores:J. Adánez, L. de Diego, F. García-Labiano, P. Gayán, A. Abad, M. T. Izquierdo, I. Adanez-Rubio. P201730355. Fecha de prioridad: 16 marzo 2017

Patente.Soporte y sistema magneticos como transportadores de O<sub>2</sub> y CO<sub>2</sub>. Autores: J. Adánez, L. de Diego, F. García-Labiano, P. Gayán, A. Abad, M. T. Izquierdo, M. Abian, R. Perez. P 201830222. Fecha de prioridad: 7 marzo 2018

Patente. Materiales basados en mezclas de oxidos metalicos como transportadores de oxigeno. Autores: J. Adánez, L. de Diego, F. García-Labiano, P. Gayán, A. Abad, M. T. Izquierdo, T. Mendiara. P 201930232. Fecha de prioridad: 13/03/2019