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Important Peer Reviewed Publications on Catalyst Ageing, Characterisation and Modelling

1. Irwin, K., **'Investigation and Evaluation of Ageing Mechanisms for Automotive Catalysts'**, PhD Thesis 2019.
2. Irwin, K., Douglas, R., Stewart, J., Pedlow, A. Woods, A. et al., "Modelling the Variation in Precious Metal Dispersion in a Three Way Catalytic Converter after Ageing," SAE Technical Paper 2018-01-0959, 2018
3. Irwin, K., Douglas, R., Stewart, J., Pedlow, A. Woods, A. et al., **"Further Analysis of the Effect of Oxygen Concentration on the Thermal Ageing of Automotive Catalysts,"** SAE Technical Paper 2017-24-0136, 2017
4. Irwin, K., Stewart, J., Douglas, R., Woods, A. et al., "Analysis of the Effect of Oxygen Concentration on the Thermal Ageing of Automotive Catalysts," SAE Technical Paper 2017-01-0998, 2017
5. J Stewart, R. Douglas, A. Woods, et al., "Sensitivity Analysis of Full-Scale Catalyst Response under Dynamic Testing Conditions - A Method to Develop Further Understanding of Catalytic Converter Behaviour Pt. 1", SAE Technical Paper, 2016
6. L. Blades, R. Douglas, G. McCullough, A. Woods: "Correlation of Light-off Activity for Full Size and Cored Catalyst Samples". Int Journal of Powertrains S2, p 148-166, 2016
7. Stewart J. 'Applying Micro-kinetic Techniques to the Modelling of Automotive Catalysis' PhD Thesis 2014.
8. Woods A. 'Ageing and Characterisation of Automotive Catalysts' PhD Thesis 2007.
9. J. Stewart, R. Douglas, A Goguet, C-E Stere, L. Blades. A Mathematical Approach to the Balancing of Mass Transfer and Reaction Kinetics in a Dual Kinetic Model for Automotive Catalysts. SAE Technical Paper, 2014.
10. J. Stewart, R. Douglas, A Goguet, C-E Stere. Detailed Validation of an Automotive Catalysis Model using Spatially Resolved Measurements within the Catalyst Substrate. Canadian Journal of Chemical Engineering, Vol 92, p 1535-1541, 2014.
11. J. Stewart, R. Douglas, A Goguet. Integrating Intrinsic and Global Kinetics as a Dual Kinetic Model for Automotive Catalysis. Proc. IMechE, PartD, Journal of Automobile Engineering, vol 228, p 285-294, 2014.
12. J. Stewart, A. Woods, R. Douglas, R. O'Shaughnessy. Performance Evaluation of Full Catalyst Assemblies on a Maxcat Synthetic Gas Ageing System. SAE Technical Paper, 2014.
13. J. Stewart, R. Douglas, A Goguet, L. Glover. Limitations of Global Kinetic Parameters for

Automotive Application. SAE Technical Paper, 2012-01-1638, 2012.

14. L. Blades, R. Douglas, G. McCullough, A. Woods. Correlation of Light-off Activity for Full Size and Cored Catalyst Samples. Powertrain Modelling and Control Conf, 2012.
15. L. Blades, R. Douglas, G. McCullough, A. Woods: Correlation of Static Ageing Effects on Automotive Catalysts. Canadian Journal of Chemical Engineering, Vol 92, p 1526-1530, 2014 CATAGEN Patents
16. A. Woods, R. Douglas: "Method and Apparatus for Testing a Catalyst Material" Int Patent No. PCT Patent WO 2010/067127.
17. A. Woods, J. Stewart "Test System with Recirculating Fluid Reactor", PCT Patent WO 2018/050661. Other Catalysis Peer Reviewed Published Research by CATAGEN Employees
18. J. Touitou, J. Stewart, A Goguet, R. Douglas, et al., Evaluation of an in situ spatial resolution instrument for fixed beds through the assessment of the invasiveness of probes and a comparison with a micro-kinetic model", Journal of Catalysis, Volume 319, Pages 239-246, 2014
19. C. McAtee, G. McCullough, R. Douglas. Performance and Characteristics of Platinum, Palladium/Rhodium and Palladium Automotive Catalysts when Subjected to Ethanol, Acetaldehyde and a Synthetic E85 Exhaust Gas Mixture. Proc. IMechE, PartD, Journal of Automobile Engineering, vol 226, p 1536-1546, 2012.
20. B. Kingsley, J. Stewart, Z. Wu, R. Douglas, K. Li: Advanced Ceramic Substrate with Ordered and Designed Micro-Structure for Applications in Automotive Catalysts. SAE Technical Paper, 2014.
21. L. Glover, R. Douglas, G. McCullough. Performance Characterisation of a Range of Diesel Oxidation Catalysts: Effect of Pt:Pd Ratio on Light Off Behaviour and Nitrogen Species Formation". SAE Paper 2011-24-0193. 10th SAE International Conference on Engines and Vehicles, Capri, Naples, Sept 2011.
22. C. McAtee, G. McCullough, R. Douglas, L. Glover. The Effect of De-greening and Pre-treatment on Automotive Catalyst Performance. SAE Paper 2011-24-0188. 10th SAE International Conference on Engines and Vehicles, Capri, Naples, Sept 2011.
23. G. McCullough, R. Douglas, N. McDowell. Deactivation of Oxidation Catalysts by Oil-Derived Sulphur. SAE Journal of Engines, Feb 2006.
24. G. McCullough, R. Douglas, N. McDowell. Deactivation of Oxidation Catalysts by Oil-Derived Sulphur. SAE Journal of Engines, Feb 2006.
25. T. Khossusi, G. McCullough and R. Douglas. Investigation of Oxygen Storage in Automotive Catalysts. SAE Paper 2004-01-1836, SAE Journal of Fuels & Lubricants Meeting, Vol 4, Sect 3, pp 805-817, June 2005.
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27. G. McCullough, R. Douglas, S. Spence and G. Cunningham. Flowrate and Heat Transfer Considerations for Oxidation Catalysts. Proceedings of the Institution of Mechanical Engineers, Part D, Journal of Automobile Engineering, Vol 218, No D3, pp 229-241, July 2004.
28. G. McCullough, R. Douglas and N. McDowell. Deactivation of Oxidation Catalysts by Oil-Derived Sulphur. SAE Paper 2004-01-1738, SAE World Congress, March 2004 .
29. E. Abu-Khiran, R. Douglas, and G. McCullough. Pressure Loss Characteristics in Catalytic Converters. SAE Paper 2003-32-0061, Small Engines Technology Conference, Sept 2003. SAE Journal of Engines, Vol 112, Section 3, pp 2123-2134, USA, Sept 2004.
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31. T. Khossusi, R. Douglas, and G. McCullough. Measurement of Oxygen Storage Capacity in Automotive Catalysts. Proceedings of the Institution of Mechanical Engineers, Part D, Journal of Automobile Engineering, Vol. 217, D8, pp 727-733, August 2003.
32. G. McCullough, R. Douglas, G. Cunningham and L. Foley. The Validation of a Two-Dimensional Transient Catalyst Model for DI Two-Stroke Applications. Journal of Automobile Engineers, Part D, Vol. 215, D8, pp 935-955, August 2001.
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34. Al-Hinti, G. McCullough, and R. Douglas, Current considerations for the application of diesel particulate filters, Proceedings of the 4th Jordanian International Mechanical Engineering Conference, Amman, vol. 2, pp. 247-263, October 2001.
35. G. McCullough, R. Douglas, N. McDowell and R.G. Kenny. An Experimental Evaluation of the Oil Fouling Effects of Two-Stroke Oxidation Catalysts. SAE Paper 982014, SAE Off-Highway Congress, September 1998. SAE Journal of Engines, Vol 107, Section 3, USA, 1999.
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43. B.P. Carberry, R. Douglas: Factors Affecting Catalyst Efficiency, a Theoretical and Investigative Treatise. SAE Paper 932397, SAE Off-Highway Congress, September 1993.
44. B.P. Carberry, R. Douglas: A Simple but Effective Catalyst Model for Two-Stroke Engines. Journal of SAE Transactions 1992, Vol 101, Section 4, SAE Paper 921693.
45. R. Douglas: AFR and Emissions Calculations for Two-Stroke Engines. SAE Paper 901599, SAE Off-Highway Congress, September 1990. SAE Trans, Vol 99, Section 3.
46. R. Douglas: Abatement of Acidic Emissions from Mobile Sources. Section B.3 of "Acidic Emissions Pollution Control", Part 2, The Fellowship of Engineering, November 1987.

High Temperature Ageing and Materials Testing Publications by CATAGEN

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48. J. Graham, S. Malinov, R. Douglas: A systematic testing procedure to investigate the influence of oxide morphology, composition and thickness on changes in the high temperature oxidation kinetics of AISI 316L stainless steel. Key Engineering Materials, vol 737, p 3-10. 2017
49. J. Graham, S. Malinov, R. Douglas: The Influence of Temperature and Alloy Composition on Austenitic Stainless Steel Oxidation Resistance. 13th Int Conf on Diffusion in Solids and Liquids, Vienna, 2017.