

Evaluation of Air Cleaning using Functionalized Asphalt Mixture Sprayed with TiO₂ Nanoparticles

Élida Margalho^{1,2*}, Orlando Lima Jr.^{1,2}, Iran Rocha Segundo^{1,2*}, Clarisse Nunes³, Carlos Tavares², Elisabete Freitas^{1*}, Joaquim Carneiro^{2*}.



¹University of Minho, ISISE, ARISE, Department of Civil Engineering, Guimarães, Portugal.

²Centre of Physics of Minho and Porto Universities (CF-UM-UP), Azurém Campus, University of Minho, Guimarães, Portugal.

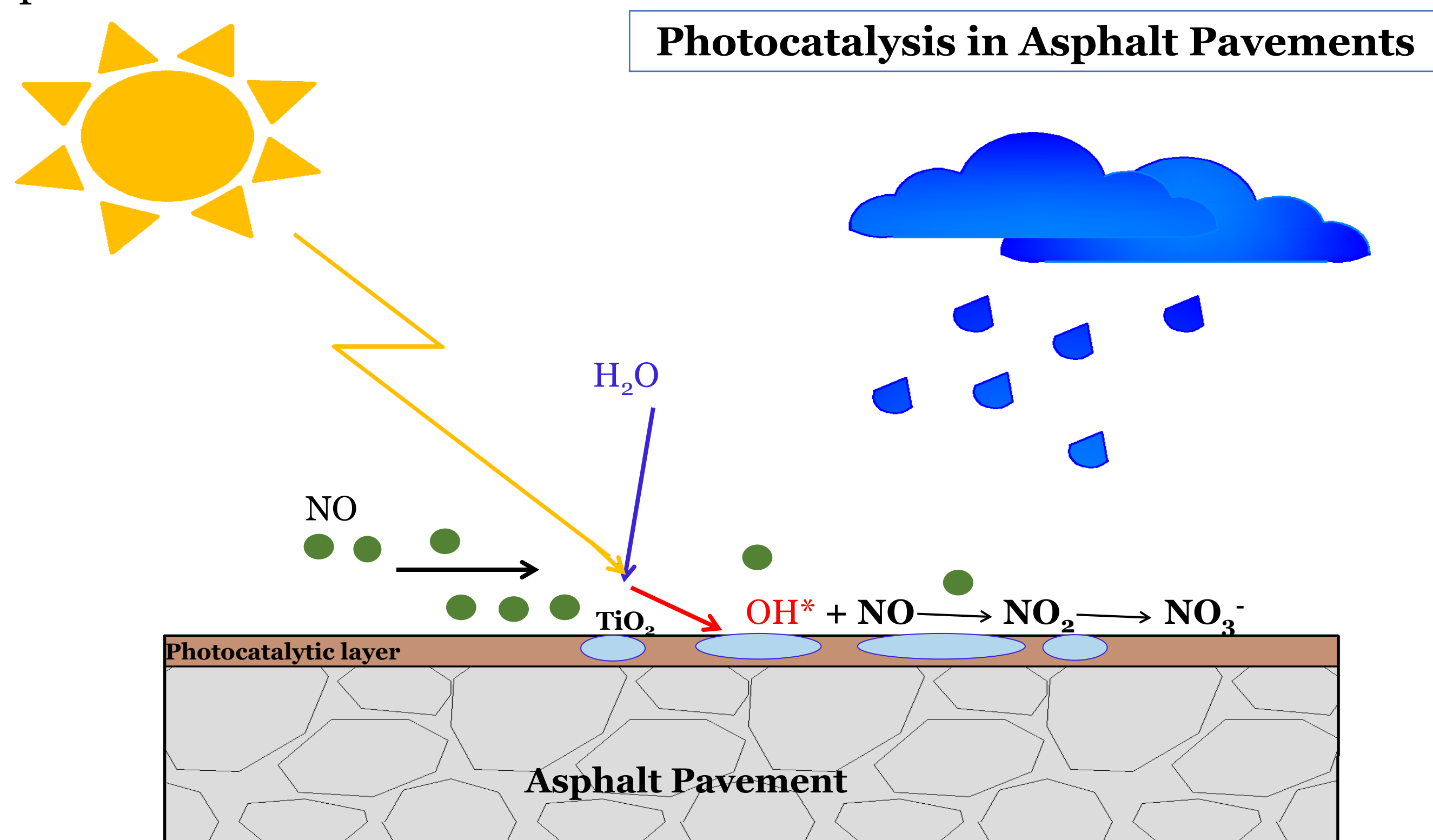
³Energy and Geology National Laboratory, LNEG Campus Lumiar, Lisbon, Portugal.



* correspondence: eng.elidamelo@gmail.com (ÉM); iran@fisica.uminho.pt (IRS); efreitas@civil.uminho.pt (EF); carneiro@fisica.uminho.pt (JC)

1. INTRODUCTION

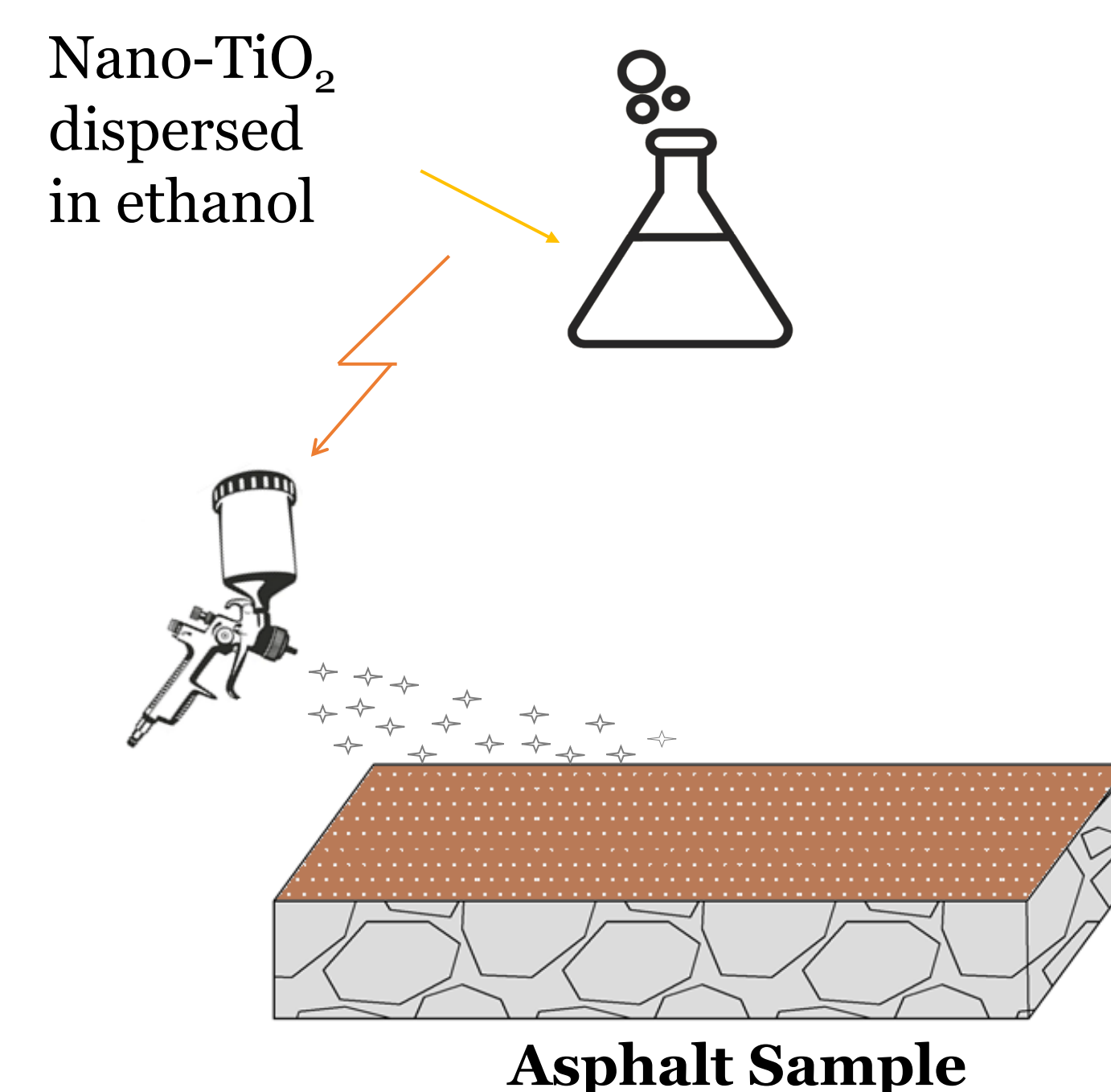
Photocatalytic asphalt mixtures have gained attention as a possible alternative to mitigate the air pollution in urban areas. The asphalt surface when functionalized with nano-TiO₂ can reduce nitrogen oxides (NO_x), a harmful pollutant emitted by vehicles that contributes to problems such as acid rain and public health concerns.



2. OBJECTIVES

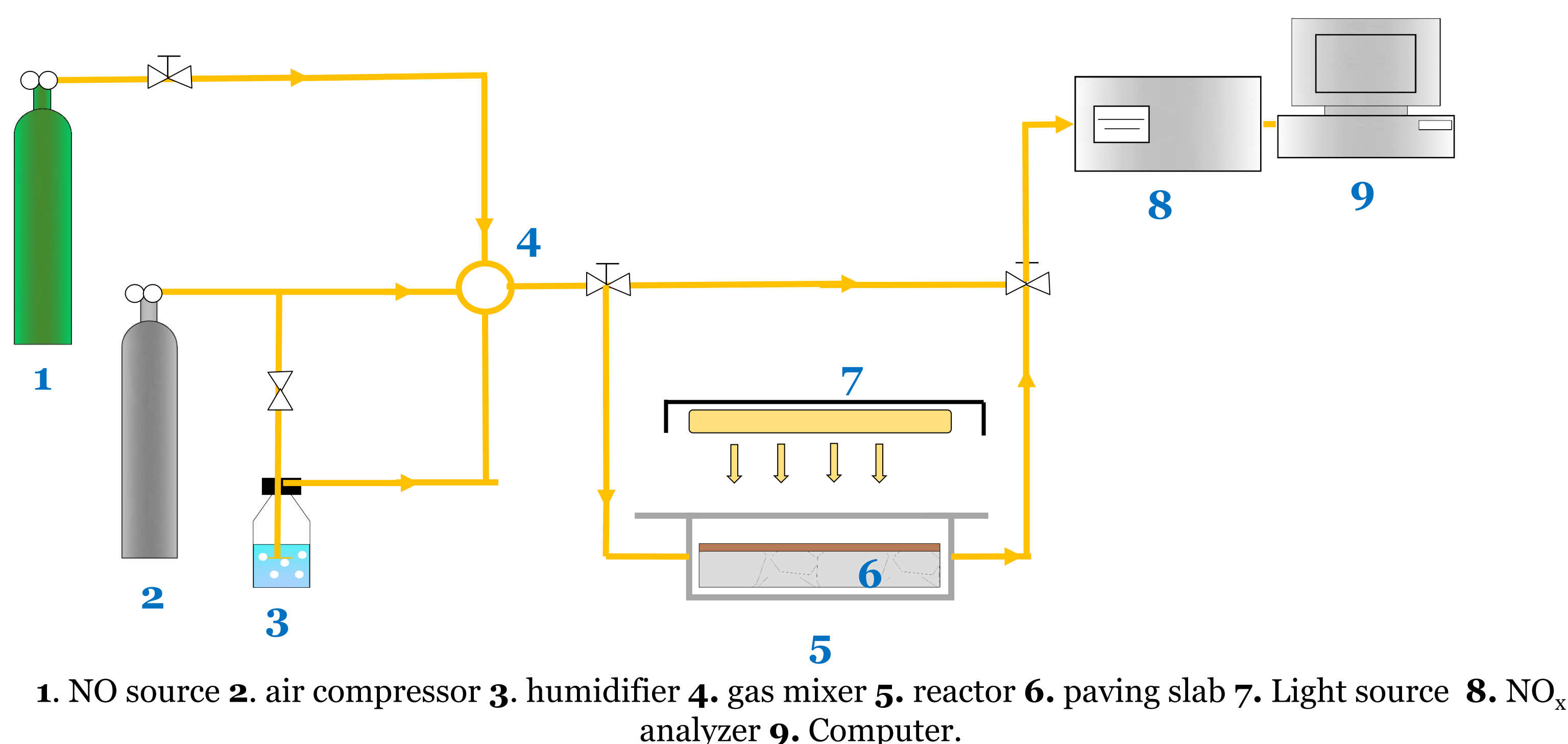
The main objective of this research is to evaluate the NO_x air cleaning promoted by the functionalized asphalt mixture. For this, an asphalt mixture AC 10 was functionalized by spraying TiO₂ nanoparticles and then evaluated using a photoreactor under the standard ISO 22197-1.

Spray Coating Method

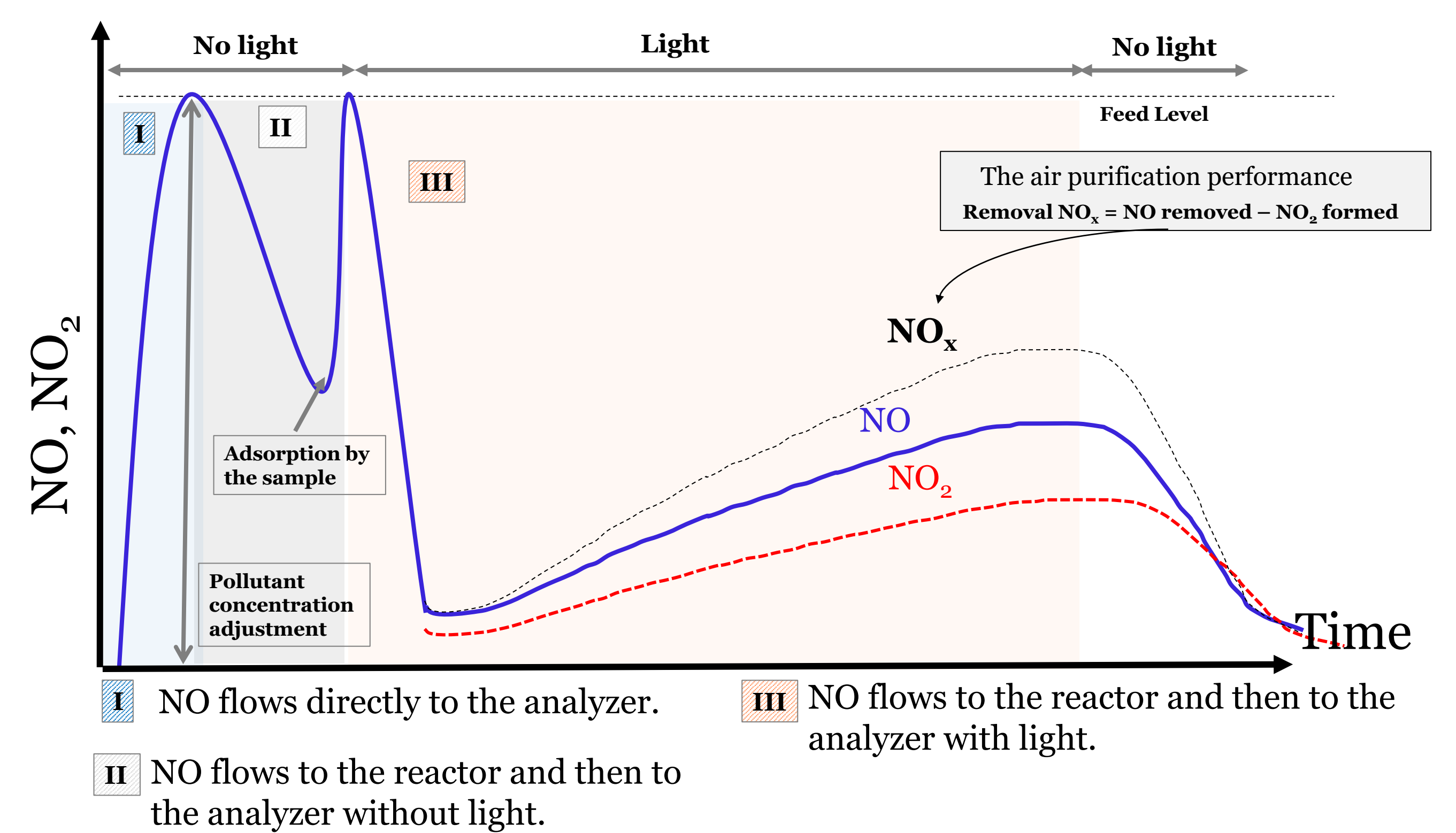


3. METHODOLOGY

Schematic diagram of the NO_x degradation test setup

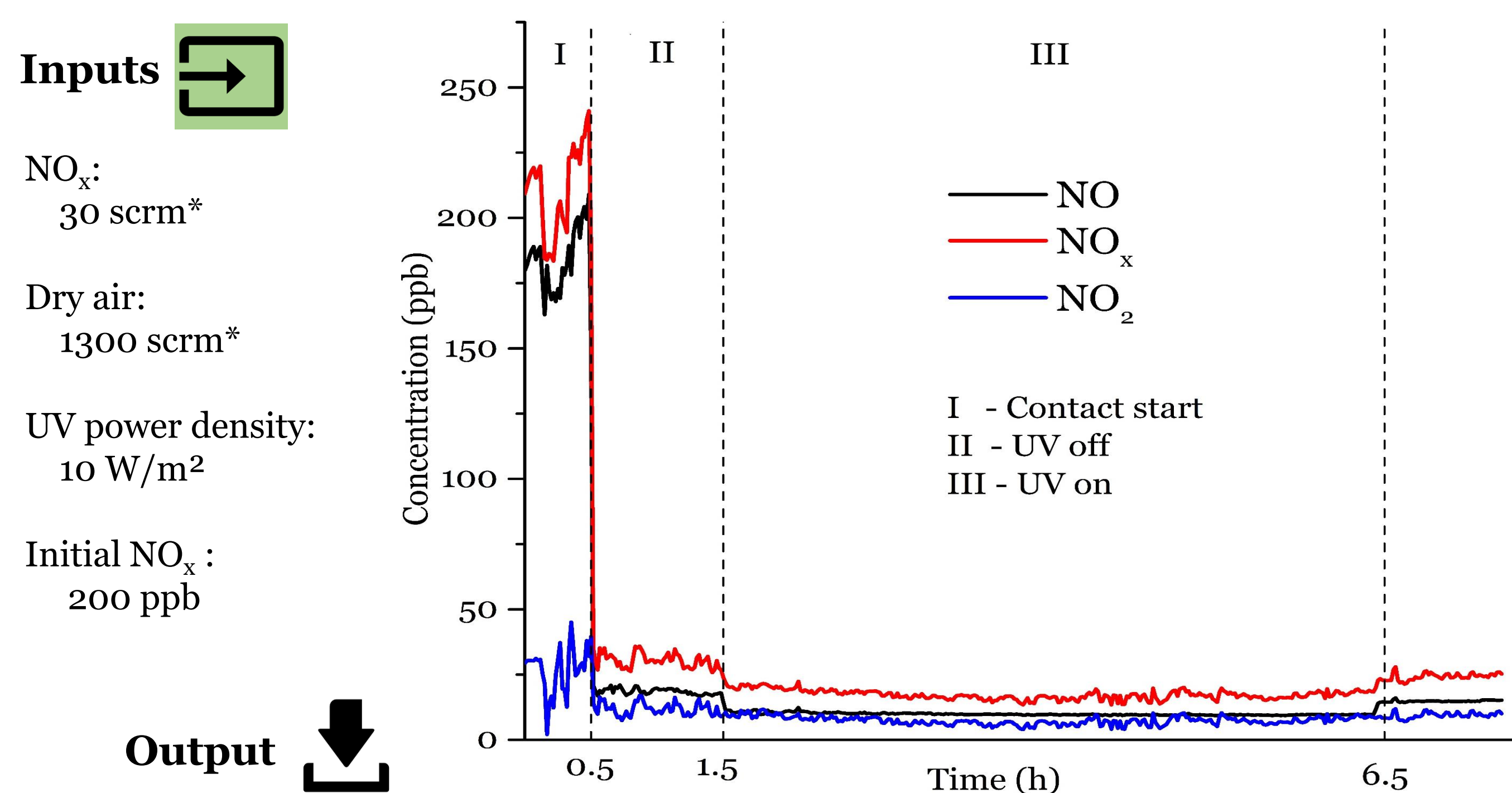


NO_x degradation analysis scheme



4. RESULTS AND DISCUSSIONS

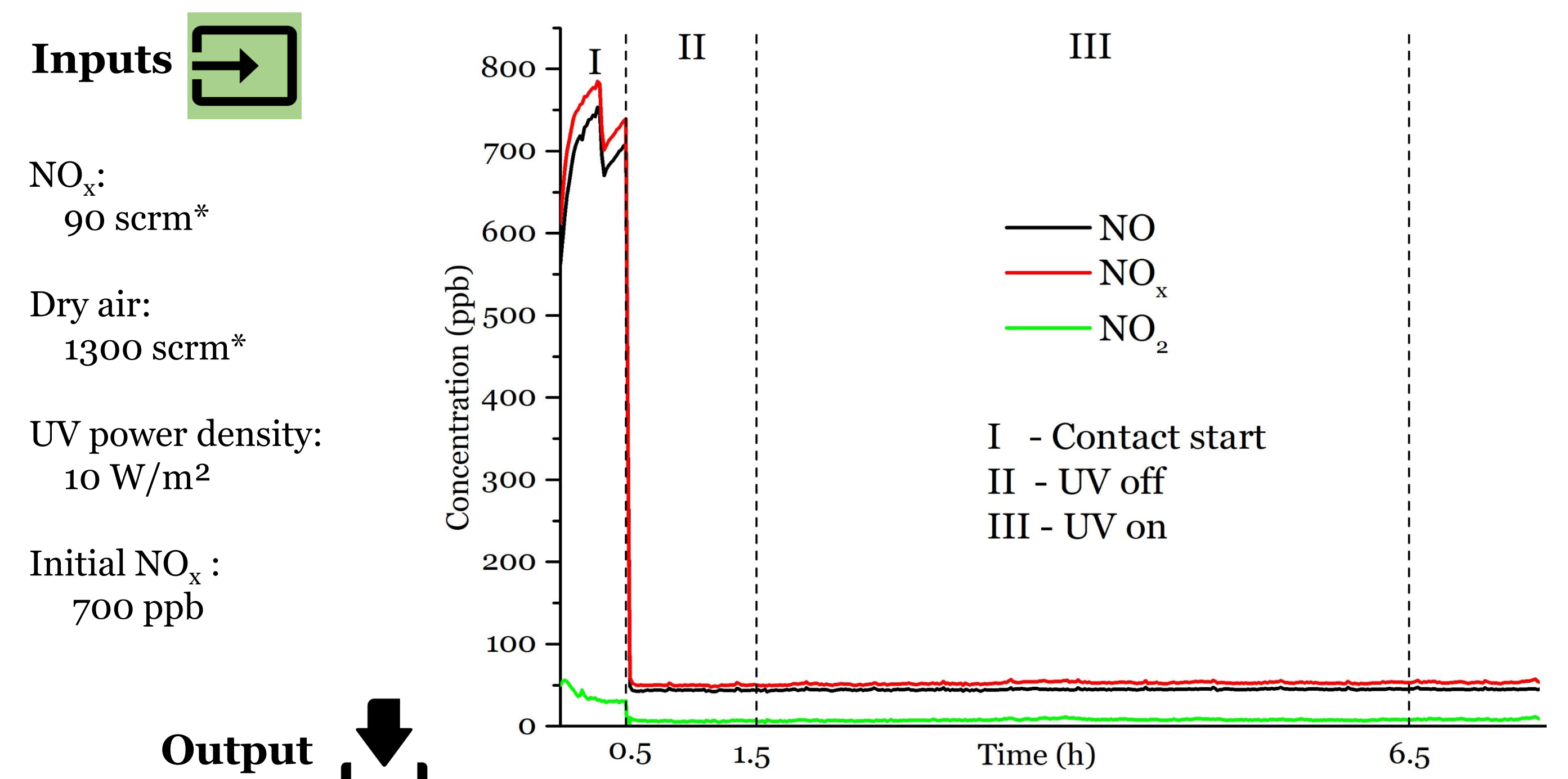
NO_x concentration during the first degradation test



Removal NO_x: 192.29 ppb

* Standard cubic centimeters per minute

NO_x concentration during the second degradation test



Removal NO_x: 760.08 ppb

* Standard cubic centimeters per minute

5. CONCLUSION

The objective of the research was to degrade NO_x by using photocatalytic asphalt samples. It was possible to remove up to 760 ppb of NO_x. The next step of this research is to study different parameters of photocatalysis (pollutant concentration, humidity, wind speed, pollutant flow and irradiation).

6. ACKNOWLEDGEMENTS

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